# Fit, Stick, Spread and Grow

*Transdisciplinary studies of design thinking for the [re]making of Higher Education.*

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## Abstract

In this research, a transdisciplinary synthesis and extension of design thinking is created, leading to a comprehensive and philosophically grounded “fit, stick, spread and grow” framework for analysing designs and designing as a social, technological and pedagogic process. Through this framework the [re]making of higher education is seen in a new light. The framework is built using insights from design research, architecture, innovation studies, computer science, sociology, higher education pedagogy studies, business studies and psychology. The research is further enriched and empirically grounded through case studies and design studies, in many instances co-developed with participant staff, students and alumni using techniques from “design anthropology”. The research is carried out at the University of Warwick, an example of a young, fast growing, self styled, entrepreneurial higher education institution. In addition professional designers (architects) and creative industry leaders are interviewed so as to put these cases in the wider context of design and business today.

In Part One of the thesis, the University of Warwick is explored as a supercomplex organisation, following Barnett (2000). Supercomplexity has positive consequences for individuals with already well developed design capabilities in that they can more effectively exploit opportunities, but for the majority, it presents difficulties and disruption. This creates a design divide, related to the digital divide, which limits the spread and growth of vital innovations. Part Two moves on to the positive task of creating a framework that examines and defines the nature of design (using an *assemblages* approach adapted from Deleuze and Guattari), designing, designers (professional, guerrilla and everyday), designerliness and design capability (both individual and collective). It considers challenges in managing design capability (especially *ad hocism* in everyday designing) and strategies for more designerly designing (including Design Thinking, the Thick Boundaries approach and practices from the creative industries). Designing is shown to work most effectively when it achieves fit (with *our* practices, projects and concerns), stick (enduring over a reasonable time), spread (to further people, projects and concerns) and grow (extending our capability for further designing). The **fit, stick, spread and grow** framework is shown to be a simple but powerful set of concepts for easing the transition to *designerliness by default* and more evenly distributed design capabilities.

## Declaration

This thesis is submitted to the University of Warwick in support of my application for the degree of Doctor of Philosophy. It has been composed by myself and has not been submitted in any previous application for any degree.

The following working papers were made available during the writing of this thesis, through the Warwick Research Archive Portal. Some elements of these papers appear in this thesis:

O'Toole, R. (2013) "Pedagogical strategies and technologies for peer assessment in Massively Open Online Courses (MOOCs)".

O'Toole, R. (2013) "A report on e-portfolios : design features, uses, benefits, examples & emerging trends".

O'Toole, R. (2013) "Innovation and design change strategies for learning technologies at Warwick : towards a 'design capabilities' heuristic for guiding practice and evaluating change".

O'Toole, R. (2013) "Flipping the classroom: a design study of the adoption and adaption of new pedagogy in a higher education context".

## Abbreviations

KL is used in citations to indicate the specification of a location in a Kindle edition of a book using the Kindle system. Page numbers (corresponding to printed editions) have been used where available.

**Diagrams and photographs**

# 1. An Introduction and a user's guide

## 1.1 Orientation

This is a transdisciplinary thesis in Arts Education, reporting upon a research project that has been co-hosted in the *Centre for Education Studies* (with Dr. Michael Hammond) and the *Centre for Cultural Policy Studies* (with Dr. Jonathan Vickery) at the University of Warwick.[1] It also relates closely to my work as a Senior Academic Technologist in Warwick's Service Development Group.[2] As will be explained, the structure of the project and the resulting thesis has emerged out of this complex transdisciplinary basis.

It begins with this introduction and user's guide. I will explain the formation and transformation of the project, its practices and its concerns over its five years. I will also detail some significant and interesting challenges that I have encountered – challenges from which we can learn much about the University and designing in the University. My methods emerged and developed over time through the transdisciplinary encounter with the domains in question – including the emergent field of *design anthropology* – a move towards a more *participatory* form of researching, concerning the relationship between people, designed assemblages, ecosystems and the environment.

[1] The experience of teaching digital media design for Jonathan Vickery's MA in International Design and Communication Management was a key source of ideas and inspirations for this PhD. I am deeply grateful for the opportunity and the good will of the many students who have helped me with these ideas.
[2] And in similar roles at Warwick since 2001.

This only makes sense following much philosophical work on the concepts of design, designing, designerliness, agency, structure and reflexivity – concepts out of which the methodology emerged. But in reality, that philosophical work could only be carried out through a long and iterative engagement with the real world in which these phenomena occur. The broader transdisciplinary method is then a negotiation through the historical paradox of philosophical concepts (that they seek to understand the world, but can only do so by directly interacting with it, which then inevitably changes the world in potentially unpredictable ways). It might be described as a kind of philosophical and designerly action research, impacting upon the development of a university and its members.

This research project is defined as being principally concerned with developing a *designerly world-view*, and applying that perspective to higher education, specifically at the University of Warwick. The perspective includes an account of:

1. Design: What constitutes *a* design?
2. Designing: How are designs created? What is successful designing?
3. Designers: Who does the designing? How does this vary? How does it combine into a capability for successful designing (or not)?
4. Challenges in managing design capability: how does the configuration of design capability in an organisation limit the capability for successful designing?
5. Strategies for more designerly designing: how can we systematically overcome these challenges and enhance design capability for

successful designing?

Each of these aspects is investigated from a broad transdisciplinary perspective so as to *create* a synthesis that then works as a critical-creative framework for considering design and designing in/of the University. The creation of the synthesis and its application to the University are the two major tasks of this project. The big question is then: how does this different perspective transform our understanding of and design for the University?

As will be seen, we cannot naïvely assume there to be such a thing as a canonical unchanging “designerly world-view”. Indeed it turns out that design practitioners and theorists are amongst the most active in reflecting upon and rethinking their own *designerly ways of knowing*. And furthermore, by necessity they are at the forefront of transformations in culture – in which the roles of producers and consumers are under contestation and transformation. The *designerly world-view* is then under production *now*, and this thesis is part of its re-invention. Universities are playing an important part in its production, as ecosystems that feed networks to sustain innovation and creativity (as much through graduates and unofficial connections as through deliberately engineered innovation functions). It is being produced, re-invented *here* and *now.* The principle movement in the transformation is towards a greater degree of participation, and a dissolution of the boundary between producer and consumer. Twinned with this, there is a dissolution of the boundary between designing and designed, in which [re]designing continues throughout the lifecycle of a product or service and beyond.

The question then becomes:

**How does this new perspective transform our understanding of and design for the University as produced by its participants – in which designerliness and design agency is distributed beyond the centre, the studio and the professional designer?**

As such, it is allied to and follows the approach of similar work in culture, communications and design studies – for example, the MIT Convergence Culture Consortium, who have applied a critical and creative approach to the tasks of understanding and designing within the increasingly pervasive world of "spreadable media". An approach that is creative, designerly, and critical (in the philosophical sense of *critique*):

> "…to think through the metaphors we all use…to resist terminology that might distort how we understand these trends and to continue seeking terms that more accurately describe the complexity of how we all engage with media." (Jenkins, Ford & Green, 2013: p.3)

Metaphors, concepts, mental models – produced with care so as to enable a realistic understanding of and practices for complex systems of people, ideas and things. Concepts that are connected to popular ideas in contemporary culture (e.g. viral media) but with an additional *critical* edge. That characterises the nature of my research well.

The concept of *spreadability* (of media)[3], developed by the Consortium out of the concept of *stickiness* (Gladwell, 2000)[4], is a good example. It works as both:

- a description of tendencies and strategies operating with increasing power in the digitally connected world;
- and the basis of a design strategy for using the opportunities afforded by new technologies and new socio-economic conditions for more ethically sound ends.

Whereas in popular culture we find new media, networked technologies and participatory culture either demonised or portrayed as the saviour of civilisation, these more designerly and evidence-based discourses describe a realistic and balanced perspective on an imperfect and unpredictable world undergoing accelerated change. Very approximately, their arguments work like this:

> There is, as always, a struggle between asymmetrically constructed powers, interconnected and transformed through co-adaptation and non-linearity. An unequal struggle "…over the shape our culture(s) will

[3] Some media are constructed along broadcast lines, communicating from one to many. Other media rely upon, and are constructed to aid, the spread of messages across networks of people, through one-to-one or one-to-some connections. They are then more *spreadable*.

[4] Stickiness has various aspects – a message might stick in memory over time, in some form of memory assisting technology (e.g. browser bookmarks), amongst a group of people; our attention might be stuck on the message for a prolonged time (e.g. we stay tuned to the TV channel); or the medium through which the message is communicated might attain a degree of stickiness in itself. The concept transfers neatly into other areas of design, and the idea (from Chapman) of designs being *emotionally durable.*

> take…a struggle being tackled on uneven terms with unequal resources." (Jenkins, Ford & Green, 2013: p.36). The development of spreadable media, and the consequent redistribution of agency to the many individual agents involved, has they claim improved the situation: "…culture is more participatory now than it was under older regimes of media power in many places." (*ibid.* p.36) However, the situation is not perfect, and "…we are a long way away from anything approaching full participation." (*ibid.* p.36) Furthermore, the quality and meaning of participation varies widely. The study of spreadable media, the conditions that shape spread and participation, offers the possibility of better design for spreadability and hence also participation, so as to address inequalities.

Such views and interests are not unique to the work of the Consortium. Many other complementary and conflicting ideas have fed into this project. Ideas including Jonathan Chapman's *ethical* and *designerly* challenge to contemporary consumer Capitalism and, I argue, its one-dimensional focus on spreadability. Chapman goes beyond spreadability as a virtue in-itself to *emotionally durable design* (Chapman, 2005) as a core value guiding the designing, adoption, adaptation and continuation of practices. Thinking this through we can see the dangers in a culture focused on spreadability alone. Designs that are spreadable might offer greater emotional durability, having a social value as well as the immediate instrumental value: *I like to tell people about the latest cool gadget, it raises my status and makes me less lonely.* But spreadability might also become too much a goal in-itself, as the source of social capital, leading to a constant churn of *next-big-things* to be spread

by individuals acting as social honey pots. Spreadability could be the enemy of emotionally durable design, with negative consequences for society and the environment. As will be seen, these effects are very much present in the University.

This is just one example to illustrate the types of critical thinking around which this thesis is constructed. Such considerations of effects and values are prime concerns for designers and design researchers.

Similarly, in higher education studies, a radical critique of the purpose and design of universities has led to revitalised concepts of commonality (Neary, 2012) and the learning landscape (Neary & Thody, 2009) – the free, open movement of people, resources and ideas in forms of *participative agency* is vital to such radical re-thinkings of the nature of higher education. Mike Neary's championing of the Student As Producer illustrates the potential of these realignments. Neary argues that this radical agenda for change goes beyond strategies for increasing student engagement in an already over-determined higher education – students slotting neatly into roles defined for them by others. I read this as going beyond the notion of the student as a legitimate peripheral participant (to use a term from Wenger's *communities of practice* theory) becoming inducted into academia – a kind of modern apprenticeship available to an elite minority of students. It goes beyond the Student as Researcher (which is not to disagree with the claim that students do valuable research and should be taken seriously as researchers). The level of participation to which Student as Producer aspires sees students becoming partners in redefining, remaking the University:

> "What makes Student as Producer more than the mainstream interpretation of student engagement is that for Student as Producer the future of the university is at stake" (Neary, 2012: p.2).

This has, of course, always been the case – students do go on to remake the University once they (the few who make it through) become academics. And it is often made in their own image, replicating the forms of education that worked for them. Thus the University is replicated as suits an elite minority (academics) of an elite minority (students). This does not in any way guarantee that it will work for the majority. But now those boundaries and rights are being contended and disassembled by the opening-up of access and the growing sense that the University belongs to the public or the consumer. Participation in its [re]making is therefore a hot topic for public discourse, and as a site through which concepts of public and private are questioned. As Neary says:

> "The aim of Student as Producer is to "dissolve"…or better still "detonate" (Lefebvre 1991) the social relation of capital out of which the current version of the university is derived…so as to recreate the university as a new form of social institution, what Giggi Roggero calls an "institution of the common"". (*ibid.* p.3)

The word "participation" takes on radically diverse meanings when seen from the opposing perspectives of private capital and Neary's Student as Producer. And this can have real practical implications for how we go about *designing*

things together in the University. Do students expect to participate in design workshops for financial returns (we have sometimes paid them)? Do they participate on the basis of the less concrete promise of receiving some additional social capital (via good references)? If we don't reward them in these ways are we guilty of exploitation? Or should we all expect to pull our weight and do our fair share of the work of designing future University things for future generations of students and staff? We might need to seriously rethink and reconfigure the University and society so as to resolve these contradictions. A critique of the divisions of labour in the University is a good starting point (*ibid*. p.7). And, I argue, a critical-creative re-thinking of designing in the University helps this along.

Alongside Neary's radical critique, Thomas Docherty's book *For the University* (2011) has been both a challenge and an inspiration. A Professor of English Literature at Warwick, Docherty describes the university as "…a site for the complexification of thought, not for its simplification" (Docherty, 2011: KL 431). That sounds good to me, but how does it fit with the current political mantra of deficit reduction and privatisation? Docherty's book might, to some, seem to be the product of a careless renegade, or a last-ditched attempt to defend indefensible luxuries, elites and academic autonomy. He tells us that:

> "...a University programme should be concerned with the production of time itself, and not with an alleged 'efficiency' model that says more must be crammed into less by eliminating the time required for play or, indeed, for thinking." (Docherty, 20112: KL 1391).

But Docherty's argument with government is over the role and ownership of student agency – and by implication, of students themselves: the right to self-determination. The battle is against policy and ideology that makes the student into an agent of government policy in which:

> "Their 'task' becomes one where they are expected to use their University education in order to fulfil a role in forms of employment that are sanctioned and legitimized by the State: their task is to contribute, directly as a result of their study, to the economy in whatever happens to be the approved fashion." (Docherty, 2011: KL 2385)

Consumer-style student satisfaction regimes can be seen to be a mechanism through which this discipline is engendered. The "student experience" is reduced to a small set of narrowly specified dimensions. It is not necessarily a bad thing that students get to publicly assess the services that they receive. The problem arises where this is taken to be the totality of what students get by *participating* in a university. There is an idea of student agency limited to the student as a consumer of services, including assessment and feedback, in which the spectrum of agency only varies along the dimension between good consumer and bad consumer. Docherty calls this a "managerialist fabrication" that "lies behind all models of thinking that want us to dignify the myth that we call 'the student experience'" (Docherty, 2011: KL 1121). It might be a myth, but it has real effects. The student's agency is diminished even before they begin to develop it. Docherty's opposition to this is based upon a deep conception of *democracy*, where democratic agency is more than just

the right of the good consumer-citizen to approve or disapprove of the standard of the services with which they are fed. Docherty states his position as:

> "...one where we retain the idea of the University as something linked intrinsically to a special kind of mobility or, more precisely, to the possibility that fundamental transformations may occur." (Docherty, 2011: KL 377)

The most fundamental of transformations are the creation and amplification of different agencies and modes of agency, the different ways of making and valuing that are the condition of deep diversity and individuality:

> "The University is about the production of difference or diversity or change: action such as this being the founding condition of our humanity and our freedom." (Docherty, 2011: KL 688)

There is a powerful *individualism* inherent in this argument. That might be a concern. But for Docherty, differentiation, the will to differ, is only the start of agency. We differ collectively, reflecting upon and negotiating the interactions and communications between us. We might argue that to be the true value of being in a student cohort, and at the same time part of networks that cut across cohorts. Students in the same year, following the same course, may diversify, develop their agency, in radically different but co-present and interdependent ways. The *humanity* that is cultivated is one of difference and co-presence and inter-relation (what Henri Bergson called a *qualitative*

*multiplicity*):

> "The University is, if you will, a place of humility, even love...It is a place where we cultivate our humanity." (Docherty, 2011: KL 457)

The freedom to develop independence and difference, and to sustain community, requires some additional reflective capacity. Docherty sees this as the immanent producer of a *deliberative democracy*:

> "...encourage that form of democracy that is genuinely reflective, thoughtful and able to adopt a deliberative approach to shared citizenship." (Docherty, 2011: KL 540)

In 2011 I witnessed this in person, at the English Department's "options fayre" for second and third year students. In this annual session, module convenors give a short presentation about their modules to prospective participants. Amongst the more conventional academic talk, Professor Docherty gave an *uncanny* performance of sonically and semantically difficult Scottish poetry. It was as much a challenge to the students as it was an explication of the module's purpose and content. An invitation to encounter difference and make something new from it. A very personal invitation to the student to make a project out of this unfamiliar aesthetic world, and hence to exercise and develop their agency. The University is a place where we make the project of ourselves, individuality (the vehicle on which we travel through life) and community, our collective project (the civil space through which we travel):

> "...the institution should become the site for the sustaining of deliberative democracy." (Docherty, 2011: KL 533).

Rather than being by default a form of consumer agency, being a student should be a more open and self-defining "participative citizenship" (Docherty, 2011: KL 544).

How can this be achieved? Docherty rings the bell for play time. He writes that:

> "Play is central to learning and to teaching; for in play, we exercise imagination and we explore possibility; we take the 'what is' and ask 'what if' instead." (Docherty, 2011: KL 1140)

In the radical creative-critical ideas of both Neary and Docherty forms of participation are explored. Forms that are neither peripheral nor inconsequential to the place and institution in which they occur. Docherty's play is serious play – freeform but with potent potential. Similarly, Student as Producer enables the production and spread of alternative ideas as to what the University should be like. In both cases, emotionally enduring products might take hold – things that have a long term attraction to their participants, perhaps even lifelong.

Close to the start of this research project I was invited to share my reflections on being and becoming in the University in a talk at the British Conference of

Undergraduate Research at Warwick (2012)[5]. I began by thinking back to my arrival at the University of Warwick as an undergraduate student, and the question I asked myself then: ***what am I doing here?***

> That's a question that I have been asking myself for some time.
>
> For a brief moment in 1991 there seemed to be a simple answer: escaping my hometown Coventry, a failing economy, and a fragmenting society. Like many young working class people at the time, I snatched at the opportunity. A doorway had swung open, almost by chance. Quick! Run for it!
>
> I did. I jumped fast and found myself sitting in the eccentric little common room of the University of Warwick Department of Philosophy.
>
> And then what? What was I doing there? In the abstract sense on a UCAS spreadsheet I was one of 18 first-years allocated to course V700 at institution W20. I might have even been assigned a special classification as a student from a "non-traditional" background. Perhaps I had been identified for upgrade from working class to middle class? Fortunately, my reality was both less and more than that: less determined, less codified, less simple; and more open, more malleable, more complex. It was *a future to be assembled, a big black hole of undetermined possibilities, dragging me slowly towards it. And*

[5] http://www.warwick.ac.uk/iatl/activities/events/bcur2012/

*a challenge - as I accelerated into its grasp, to **design** and **construct** myself a vehicle that could carry me into that future.*

I then went on to describe a ***constructionist reframing*** of the question:

> The answer to my question *what am I doing here?* is in part answered by reframing it as *what am I making here?* - with the answer being: *I am making my ability to make, my agency.*
>
> Three significant projects in higher education research and development urge teachers and students to perform a similar reframing: *Student as Producer*, *Open Space Learning*, and Thomas Docherty's book *For the University: Democracy and the Future of the Institution*. These, and other projects (to be discussed), could be seen as the formation of a new *constructionism* in the study, design and delivery of higher education. A reinvigorated interest in how we do, and how we should, make our world - not an *idealist or post-modern social constructivism*, but a *realist constructionism.* In *Reassembling the Social,* Bruno Latour argues for a re-appropriation of the term *constructivism* from idealist and post-modernists to the expanded realism of Actor-Network-Theory, as "…a synonym for an *increase* in realism" (Latour, 2007: p.92); I agree with the sentiment, but prefer to distinguish these two constructivisms by using Papert and Harel's (1991) term *constructionism*.

This began the process of reconsidering the University through the lens of the

designer, both the professional designer that I am today, and the everyday designer of my student career.

All of these discourses, and more, illustrate the centrality of such phenomena as spreadability, stickiness, emotional durability, and participation to experience and theory today. My research builds critically upon such perspectives, with a transdisciplinary synthesis that creates a rich framework of concepts - including fit, stick, spread and grow, design agency, designerly reflexivity and design capability - applied to what has rapidly become one of the most significant and contested of cultural, political and socio-economic formations: higher education.

Universities are not immune to or disconnected from these struggles and from this unevenness in access to opportunities and capabilities (although perhaps they should know them better). Indeed we might argue that they are a major site for their working-through, and have been for some time:

> *"Etre libre en 1968, c'est participer."* [6]

[6] "To be free in 1968, means to participate." – student activist slogan, Paris, 1968. From https://libcom.org/history/slogans-68

## 1.2 The University of Warwick

The application of the framework to Warwick, a university with a rich and contention-filled design history, is especially interesting. Warwick was founded in 1965, and has grown fast, with over 23,400 students and 1,390 academic staff, many of whom commute daily onto a main site that covers 290 hectares[7]. It has been ranked by the QS organisation as the global third-best university *under 50 years old* [8]. Internal strategic communications strongly play-on the idea of it having a certain 'attitude', as expressed in the Vision 2015 institutional strategy statement[9]:

> "Excellence in research and in teaching and learning is paramount. Everything else must be subsidiary to this value."

> "Ambition and drive: Warwick's future success is totally dependent on the ambition and drive of its staff."

> "Entrepreneurial flare: An entrepreneurial attitude is an integral part of the University's make-up."

> "Independence: The University is an independent entity which remains autonomous in its governance and subscribes to the principles of unfettered rational inquiry."

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[7] http://en.wikipedia.org/wiki/University_of_Warwick
[8] QS Top 50 Under 50 (May 2012) http://www.theguardian.com/higher-education-network/2012/may/29/top-50-universities-under-50-2012
[9] Vision 2015 – A Strategy for Warwick (2007)

> "Warwick will be positioned as an intellectual gateway to the UK and beyond. We must therefore bring sharper focus to our regional, national and international engagement, so that Warwick will be perceived as a key node on the international map of higher education."

This first institutional strategy was written in 2007. At that time the idea of a single, central strategy was still novel. The details were a relatively wide ranging product of a centre-led but (partially) participatory consultation process. However, the focus upon a single ambition as a kind of universal measure of success was more controversial. In his introduction to the strategy publication, Professor Nigel Thrift (Vice Chancellor) wrote:

> "National pre-eminence is no longer enough: we have set our sights on making Warwick a universally acknowledged world centre of higher education by 2015, firmly in the top 50 of world universities." (Thrift, 2007)

The slogan then was "top 50 by 50" (by 2014 Warwick had made it to 61 in the overall international table of universities). But much has changed since 2007. The revised institutional strategy (published towards the end of 2014) might turn out to be a wiser and more mature production. Institutional strategy is no longer such a novelty. Participation in the creation of strategy is broader, more inclusive – now that we have experienced its impacts on the daily life and development of the institution, perhaps more people have a sense of its significance and a greater interest in its formation (this is my speculation informed by my own participation in the process of developing the new

strategy). But the Warwick attitude is still there, expressed with even greater confidence:

> "Our vision is to be a world-class university. One with a dynamic, enterprising approach to solving global challenges; one that enables students to create their place in the world; one that defines the university of tomorrow." (Thrift, 2014)

Whether we believe such rhetoric or not, a visit to the ever-changing campus illustrates the extent to which it is a *designed* environment – the product of:

1. human activities seeking to tame or to make the most out of complex, hard-to-predict, emergent behaviours, increasingly oriented towards efficiently capturing and extracting an in-flow of Capital in the form of students (and their money);
2. and, I argue, human reflexive deliberation using the campus as a *live canvas* upon which it can sketch and experiment, so as to think-through, develop, question, confirm, and impose ideas about what the University is and what (or who) it is for – as such it might be seen as a massive and uncoordinated *reflective practicum* (following Schön's definition) in which university professionals (and with lesser scope for power, students) have learned *how to make and remake a university* – this is, I argue, the default nature of design thinking in the University.

Donald Schön's *Educating the Reflective Practitioner* (1987) is central to my arguments and the view of the University produced in this work. It will be dealt

with in more detail when we come to consider designing and designers. But for now, a single simple idea will illustrate my direction of travel: the reflective practicum. Schön investigated and detailed the workings of such learning spaces/processes (in reality, the practicum is a complex assemblage of many elements including attitudes and tacit understandings). He argued that learning "designlike practice" requires this special kind of learning space because:

> "…a significant part of what a beginning student of designlike practice needs to learn, she cannot understand before she begins to design. She must begin designing in order to learn to design." (Schön, 1992: p.162)

The practicum is a safe space in which moves may be rehearsed and, importantly, mistakes made and reflected upon. But what happens when we need to become good at designing and we do not have access to such a practicum? Learning by doing *for real* has consequences.

This tendency to *think through building* and other forms of construction has obvious results. When a large institution and landscape develops in this way, the consequences can be chaotic.

*The University of Warwick Central Campus from the air (2012).*
*Image courtesy of the University Media Library http://www.warwick.ac.uk/medialibrary/*

There is very little room for "nature" (as sublime, untamed) in this picture, which is increasingly pushed to the periphery of the campus. But there is in its place a chaotic human-generated sublime. The last large green space within Central Campus will disappear by the end of 2016.[10] A nature reserve wraps around the western and northern border of Central Campus, creating a barrier between it and the Gibbet Hill Campus on the hill (containing Life Sciences). It blends like an encroaching jungle into some of the halls of residence. However, there is an increasingly urban feel to the place. Where green biological stuff is allowed to take root alongside academic buildings, it is carefully contained and manicured. The same might be said of that other sublime: political dissent.

[10] The poets of the Warwick Writing Programme have worked hard to counter this by designing the wilds of Tocil Woods into their activities and use of space. As will be seen, they are amongst the most designerly and innovative of Warwick's students and staff.


*A student protest group on the lawn outside of Senate House, 21st June 2014. This was held in the middle of an Open Day for prospective students and their parents. It blended in, unopposed, with the "official" design for the Open Day.*


*Al fresco careers and skills advice – in recent years Warwick's central support services have begun to get into and make the most of Warwick's open, free-flowing campus way of life.*

*Tocil Field, the last large green space on Central Campus. Used for self-organised sports activities. The new Teaching and Learning Building will probably be built here.*

*The Social Sciences courtyard is one of many tranquil spaces on Central Campus. The building is a comfortable red brick construction from the second big wave of development.*

*Halls of residence viewed across a lake and through woodland.*

*The lakes next to Tocil Wood Local Nature Reserve (managed by Warwickshire Wildlife Trust). Bird life includes herons, kingfishers and spotted flycatchers.*

*Allotments for students and staff, a response to urbanisation supported by the Students' Union. There is also an orchard, celebrated in 2014 by the Warwick Writing Programme in The Apple Anthology (Reddick & Ttoouli, 2014).*


*The Piazza between the Students' Union and the Arts Centre is a location for informal gatherings, activities, graduation celebrations, the farmers' market and salsa dancing.*

*A panoramic sweep across a slice of the Central Campus, showing a mix of building styles from 50 years of development – smooth curves replacing sharp angles.*

As such an artificial place, with design innovation playing an essential role in its success, Warwick is a fascinating world for design students. And yet the University has no dedicated design school or school or architecture. Design research only occurs as a secondary or interdisciplinary aspect of other more dominant academic disciplines (design for the optimisation of manufacturing in the Warwick Manufacturing Group, design awareness for business in the Warwick Business School, the management of communications design in the Centre for Cultural Policy Studies, design history as an aspect of global history in the History Department). Over the course of this research project (2009-2014) the University has changed at an even faster rate – not only in physical terms, but also with the introduction of new technology services and the "redesign" of whole faculties – and yet still little is heard of design methods, design thinking or even the more familiar concept of *learning design*.[11]

**Warwick presents an interesting paradox: an artificial environment, produced by design, often on a massive scale, and with design ever-present as agency devolved to individuals and small collaborations, in which the *designerly world-view* remains unfamiliar. This research aims to unravel this paradox and to discover how a contemporary *designerly***

[11] Several teams, including Academic Technology and the Learning and Development Centre are now working together to address this gap.

***world-view* might be introduced into the everyday practice of the University.**

As a way of elucidating the nature of this paradox, I delved into the design history of the University – revealing a slow oozing expansion of its grey concrete forms across the site, combined with red brick, steel and architectural glass in different configurations at different times, producing a confusion of styles, punctuated by brief moments of crises and invention, sometimes with brilliant results. This longer view provides an important alternative perspective for understanding the role of design at Warwick up to the present day. The design history of the University is often hidden from consideration in present day designing. Recovering some fragments of its character might help us to understand more about the context in which designing occurs today.

In 2010 the Reinvention Centre at Warwick curated an exhibition on *The Idea of the University.*[12] It combined photographs and architectural plans from the earliest days of the campus, as well as interviews with architects and university people. A sample of the exhibition is now on permanent display at Warwick's Institute for Advanced Teaching and Learning (IATL). I have returned to this exhibition for inspiration and to get a sense of how imperfect conditions and confusions formed the legacy infrastructure in which we work, teach and learn today.

[12] Curated by Cath Lambert, Hannah Lever, Danny Wilding, Laura Moorhouse, Laura Evans, and documented online at http://www.warwick.ac.uk/iatl/cetl/filmspublications/ideaofauniversity/

This prompted *personal* reflections on being and becoming at Warwick, and a series of texts and images that continually motivated this research project. I had developed my own version of the design history with a *personal* response to the University as I knew it as an undergraduate student (1991-1994), as a member of staff (from 2001) and as a PhD student (2009-2015).

I wrote that the University story began with big design ideas and a certain dated notion of who designs and how they do designing. Then, as soon as the idea of the University began to take hold (in the mid-1960s), contentions and controversies erupted.

These reflections performed an important role in the research project, as an ever-present problematizing and inspiring background for me, but also as something quite obviously missing from the considerations of the people that I have followed in my empirical work. Very few people know of these stories. Even fewer use them within the critical-creative work of remaking the University.

In September 2014, for example, I discovered by chance that we had refurbished with state-of-the-art equipment a lecture theatre that had played a significant part in the invention of the approach to lecturing commonly found in the Social Sciences Faculty at Warwick. In an interview about his memories of the early years of the University, Professor Robert Dyson described the design of room A0.23 as the “flagship lecture theatre”. It was “the first horse-shoe lecture room on campus, designed to facilitate interactive learning, particularly case teaching.” (Dyson, 2010: p.6) We had, unknowingly,

refurbished an influential example of early-1970s learning space design innovation. Having myself been a student in that lecture theatre (and others like it) I could then make the connection between the design, the kinds of student-lecturer relationship that it encouraged, and my personal expectations concerning learning spaces. Fortunately, the refurbishment team (led by Jonathan Owen of Audio-Visual Services) had understood the nature of the room and added new technologies to work with that original design.

*The horse-shoe shaped A0.23 lecture theatre in the early 70s.*

*A0.23 after the 2014 refurbishment. The room contains six screens, onto which laptops, tablets and phones may be displayed by staff or students via Wi-Fi. The room may therefore be used flexibly in various different modes, led from the front, or split into smaller groups working on separate screens.*

My own interpretation of the University's story is informed by the *Idea of the University* exhibition and other key texts, as well as my own experiences of studying and working at Warwick. It is neither the complete story nor a thorough excavation of the facts. But it does give a flavour of the place and its history and the impact of that history on designing in the University today. And

most importantly, it illustrates the kind of location-specific design knowledge that is missing from designing today.

In an interview conducted at the very start of the project, Warwick's Registrar Ken Sloan talked about the importance of knowing the history of the place. He was especially concerned with getting away from what he called the "sculpture trail" approach to design and development. The University, he argues, should not be satisfied with creating a series of disconnected projects at which we can point and say "we did that, isn't it pretty" – moving between items with no sense of continuous story or progressive design dialogue. This was, I argue, an astute observation. Design history is missing. In 2015 Warwick will celebrate its 50th anniversary. Leading up to that date, work is under way to recover the lost stories – and this follows on from *The Idea of the University*, although there is a chance that in wanting to produce a celebratory picture for people, some essential aspects of the story will be forgotten.

Later in this thesis, where we consider the role of stories and ideas in designs and designing, we will return to the significance of such stories – they may have powerful effects, and their absence equally has serious implications. As I discovered, some people have especially well-developed design history narratives, and are able to use those stories to shape dramatic design innovations, drawing-in and convincing many other people to support their work.

The reflections included below are *my* contentious interpretations of already

contentious accounts. But less contentious would be the claim that since its early years design has faded into the background of the University, safely concealed from controversy – until today. In a lecture given to the administrative and services staff in December 2014[13], Nigel Thrift went as far as saying that the University "was never designed", and certainly not designed to do the many conflicting things that are expected of it today. Thrift's rhetorical aim in the lecture was to argue that *now* design does matter, and given the present and future pressures on the University, it needs to get its act together. As part of this, the Vice Chancellor reminded the audience of *some* relevant points from the institution's design history. However, the argument was constructed not to give a complete account of the design history of the University, but to lead into a specific view of the challenges that we face and the options for the future, and most importantly, the case for massive change (introduced with a reminder that the University is always changing). In this way design history constructs a kind of *choice architecture*, and becomes part of designs and designing.

Against the claim that the University has not been designed, I have found that the University is full of design and designing. However, there has been very little cohesion and continuity to the designing. It has not been designed as a totality. But how could such a large complex thing (in space and over time) be designed in that way? But it also seems *not* to have been designed with a consistent and pervasive set of values in mind. A continual forgetting of the design history of the place contributes to this inconsistency.

[13] The keynote address opening the Warwick Network Day for administrative and services staff, 15th December 2014.

The loss of design history is both a cause and an effect of the discontinuity in design values. And in my research I have discovered many issues resulting from that gap. The erosion of social spaces being one of the most negative of consequences. I heard of buildings and landscapes being designed with spaces and facilities included to add the essential social element. In some cases, the eventual implementation cut-out those elements so as to reduce cost (they look great on the artists impression, but once past that stage might get filtered out of the design as it focuses on the logistical challenge of office space and teaching space per pound spent).

The proposed social space around Claycroft Residences was one such omission.[14] In other cases, social spaces were built into the design, and performed an essential balancing force in the architects vision. But over time that is forgotten and the balance eroded. In the Humanities Building, social spaces have been converted into offices and teaching rooms. In this way we can see how when the memory of the designer's intentions is lost the intended holistic balance of the design is broken. The design histories behind less tangible designs prove even more difficult for us to recover. For example, as I discovered, curriculums get designed around sound and well understood principles. But it does not take long for that reasoning to be forgotten as staff come and go, and changes in resources and interests demand *ad hoc* modifications.

Recovering design histories may then work to recover our capability to more effectively grow designs over time. The gist of Nigel Thrift's argument works

[14] As I learned from the Claycroft Warden.

in that way, highlighting positive features of the University over time. And that is an important thing to do, producing narratives over which we can argue – whether we agree or not. So here is a sample of my version of the story (with thanks to the Reinvention Centre, IATL and to Sarah Shalgosky of the Mead Gallery at Warwick). It focuses on the built environment, but includes campus art as a way to connect with designs and experiences beyond physical space. Such a physically-oriented design history is more easily recovered – that is a shortcoming, overcome in the research reported in the main body of the thesis.

### *Warwick University – a personal view*

In his interview for *The Idea of the University*, former registrar Mike Shattock (at Warwick between 1969 and 1999) describes how the architecture firm Arthur Ling rushed to create and publicise a design for the University known as "the towers of learning". The initial drawings were published in The Times:

> "…long before an academic advisory board was set up which could start thinking about what kind of subjects could be taught…so Ling's plan was a complete fantasy prepared even before Coventry City Council had formally agreed to make a bid for the establishment of a university." (Mike Shattock, interview text from the exhibition)

Ling's design was rejected, but perhaps it had already prejudiced the later design process. Was the eventual design a form of modernism chosen to be *less* brutalist? The Czech architect Eugene Rosenberg, a student of La Corbusier, designed the first phase of construction on the Central Campus (1966-1967). Rosenberg's ideas featured:

> "…rectilinear modernist buildings structured around high-rise apartment blocks set in parkland, a design similar to La Corbusier's Ville Radieuse of 1933." (Shalgosky, 2008) [15]

The high-rise blocks were replaced by more modest low-rise halls of residence. And, importantly, public spaces were deliberately identified as places of culture and contemplation through the siting of prominent art works (a tradition continued by the Mead Gallery today). Rosenberg was a proponent of public art and the integration of art and architecture – as Mead Curator Sarah Shalgosky tells us in her introduction to the University Art Collection[16]:

> "These buildings were characterised by Rosenberg's passionate dedication to public art." (Shalgosky, unknown date) [17]

She reports that, shortly before his death, Rosenberg wrote:

> "I am committed to the belief that the artist has an important contribution to make to architecture…architecture is enriched by art and that art has something to gain from its architectural setting. If asked why we need art, I could give answers based on philosophy, aesthetics, prestige, but the one I put high on the list is that art should be part of the enjoyment of everyday life." (*ibid.*)

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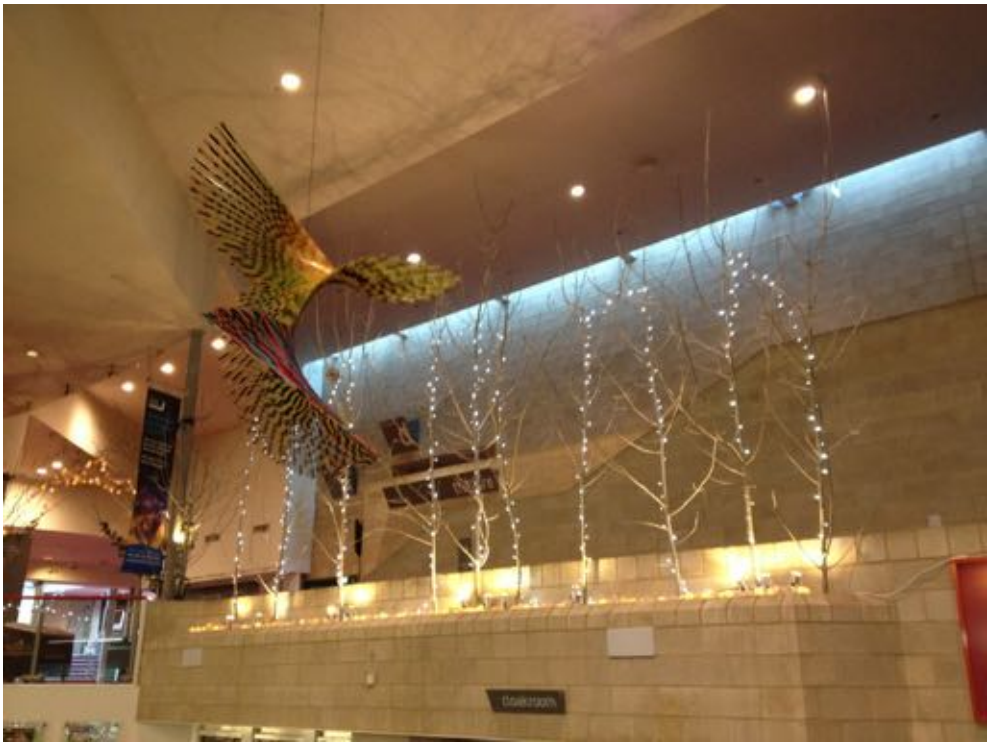
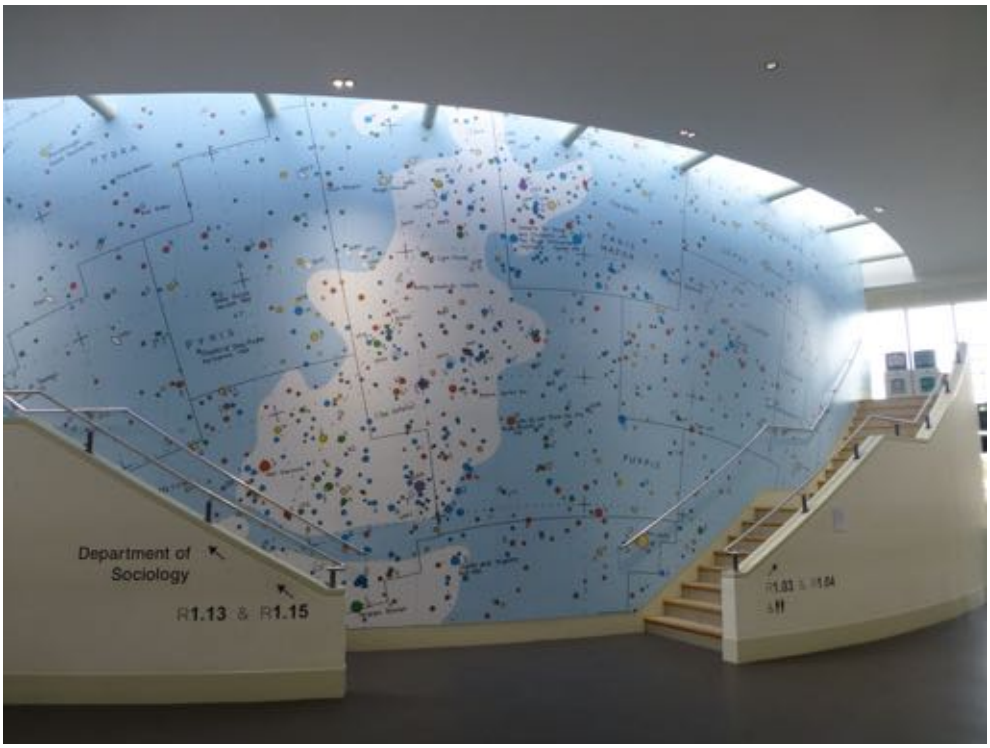
[15] From an information plaque in the Humanities Building, created as part of the Warwick Art Collection.
[16] Catalogue at http://www2.warwick.ac.uk/services/art
[17] http://www2.warwick.ac.uk/services/art/exhibitions/introductory/

As a result, Warwick's Art Collection plays an important part in the designerly feel of the campus. There are now over 900 works in the collection, from small photographs to building-sized sculptures. The following images represent a sample of the range of artworks and, just as importantly, their locations.

The artworks are distributed on display around the whole campus, including the corridors of academic buildings and offices. Larger sculptures are especially significant in providing enduring backdrops to the experience of being and becoming at Warwick. As surroundings change, sculptures remain as a constant.



*Op Mobile No.10 by Nechemia Azaz (1972) in the Arts Centre foyer. One of the 900+ artworks in the University Collection - http://www2.warwick.ac.uk/services/art/artist/nechemiaazaz/wu0075*




*Simon Patterson's Cosmic Wallpaper provides a stunning backdrop to the Ramphal Building foyer. http://www2.warwick.ac.uk/services/art/artist/simonpatterson/wu0791*

*There are many delightful visual details to be found on campus. This collection of glowing orbs hangs from the glass roof of the cinema and Mead Gallery atrium in the Arts Centre.*

*Campus art works can provide a kind of framing to social and academic activities. In this photo I am interviewing Sholi Loewenthal of the SIBE student activist group and the Humanity Online project. The sculpture is Richard Deacon's iconic Let's Not Be Stupid (1991), a familiar site to anyone who has spent time at Warwick. Popular interpretations include: a pair of handcuffs melting their way out of prison; two giant penguins, one of which is trapped in a cage.*
*http://www2.warwick.ac.uk/services/art/artist/richarddeacon/wu0409*

With the final more moderate campus design in place, and the balance between modernism and human-scale art taking effect, there followed a period of settling-in and the discovery of how the campus might be enjoyed. The University community found its balance by gently reacting around design ideas that were found to be ill-fitting, and by evolving behaviours more akin to the open, democratic values promised by the expansion of access to higher education – as described by a representative of the AJP Architects firm interviewed for the exhibition:

> "[Warwick] wanted the buildings to be very open to the community…here it's more open-spacing, it's egalitarian, it's about different departments having an equal weight…"

As will be seen, these design values are still present, but their implementation is always complicated.

Things did not always proceed quite so smoothly. The design of the University, born out of confused political and social circumstances – between Wilson's "white heat" Labour government and the economic and industrial troubles of Heath's Conservative administration – was the source of significant conflict.

From another perspective, the resulting modern university is an unsustainable and unstable product of 1960's industrial design. In *Warwick University Ltd,* the historian and critic E.P. Thompson famously implied parallels between the Hillman Avenger (a car for all ages) and the sleek, fast, shiny new University

of Warwick (Thompson, 1970: p.14). It was built on the edge of what was at the time Britain's "Motor City", Coventry.

Consider the launch party for the Hillman Avenger car, a reminder from E.P. Thompson of the design-milieu at the time of Warwick's creation:

> "More than £400,000 was spent by Rootes on promotion and publicity: a jamboree for sales executives and correspondents in Malta, Avenger girls in black leather gear...The hard-spined, streamlined form of business efficiency - greater productivity, cost-analysis, the drive for exports - turned over for a moment in the choppy seas of competitive commerce, and revealed its soft white underbelly - swinging 'classless' hedonism, conspicuous sexual display, and an open celebration of money and of success which would have shocked the nonconformist mill-owners and the ascetic Quaker bankers of the first Industrial Revolution." (Thompson, 1970: p.14)

Thompson's consciously controversial account was written at a point of crises in the history of the University – or perhaps in the history of universities more broadly. The need for an independent Students' Union building was opposed by the University's leadership – thus leading directly to a confrontation with an increasingly self-conscious and liberated student body. But it also occurred at a point of crises in British Industrial Capitalism – the Rootes Group had just been taken over by the American industrial giant Chrysler, the Avenger seemed to be a desperate attempt to retain prestige and design autonomy in the UK. Thompson's narrative, co-written over two intense weeks at the

height of the crises (although it reads as a set of well-rehearsed arguments onto which contemporary events are grafted), is a political critique – decisions are being made, resources expended, lives changed, in the name of the people, or the country, or Reason, common sense, future generations, modernity – but there are, revealed in the critique, other dark forces and self-interests being served and power processes at work.

There is then something *historiographically* interesting about Thompson's account, marking a significant undercurrent in the construction of the narrative: the link between power and design – his questioning of the ownership and origins of the *design agency* at work (although not stated in these terms, he does contend the role and practice of the University's architects), its potentially toxic effects upon the university and the lives of its people, and the production of a blueprint for academic life through the *architectural imaginations* and pleasure centres of a secretive elite. The decision makers, the big players, are shown to be disconnected from the negative impacts that their design agency has upon the constituency that they purport to represent.

And then over time the University's origins in the aesthetics of industrialism and modernism slowly faded from memory, just as the mighty car factories of Coventry were demolished and replaced by vast retail parks. Disappeared, to be followed by decades of uncoordinated *ad hocism*, only loosely connected to periodically inscribed and refreshed "master-plans" for development, and increasingly captured by a growing consumerism.

Meanwhile, the ‘market’ for a higher education experience has continued to grow, tracking Britain’s conversion to Middle Class values and the disappearance of traditional Working Class industries. This relatively steady-state of growth has been punctuated over time by significant changes in funding and government policy. But for many institutions, especially Warwick, the crises, shocks and opportunities have been absorbed through the reliable combination of a scalable, generic, core platform and the mostly unrecorded and poorly rewarded labour of staff and students, leaving little long-term mark upon the institution over time. In physical terms, the core has varied little from: seminar room + lecture theatre + library + bar + halls of residence. In pedagogic terms, a small number of common elements are relentlessly recombined: lecture + seminar + independent study + essay + exam. All of which is administered on an ever greater scale by an increasingly technocratic bureaucracy.

I will end my brief design history on a pessimistic note, concerning the consequences of un-designerly designing. There are still a few places on campus where, assisted by a switch into black-and-white visuals and a retro sound-track, one can almost imagine the sense of acceleration that might have been felt during the rushed early phases of construction. However, the effect quickly fades. The architecture and decor, despite surviving in its late 60s and early 70s form until well into the late 90s, for most people seemed fleeting, an experience demanding of neither attentional-immersion nor time spent dwelling in memory. It consequently failed to foster any kind of *emotional durability* (as defined by Chapman, 2005). Instead, there was a superficiality, an insubstantial rootlessness that swings between an ethic of

making-do and a continual churn of novelties – large, even building-sized flat screens are the latest proliferation (a default method of disposing of surplus funds at the end of the financial year).

More recently things are changing fast, and design is becoming a very visible matter of concern. In 2014-2015, the campus is being quite radically redeveloped – part of the current nationwide university building boom.[18] Roads are being redirected, a bus station constructed, many new buildings and outdoor spaces are appearing – including Warwick's first teaching-only "showcase" building.

The Vice Chancellor's "University of Warwick Record 2006-2014" web page states that spending has included a "£250 million capital programme to 2012, £350 million capital programme to 2018" with the National Automotive Innovation Campus (NAIC) project being the most expensive at £96 million (an new initiative putting the Jaguar Land Rover collaboration at the heart of the campus, with a re-engineering of the original Lord Rootes vision for a University closely linked with the car industry).[19]

Exciting times.

[18] An estimated £9 billion to be spent by Russell Group universities between 2014 and 2019 - http://www.bbc.co.uk/news/education-27491037
[19] http://www2.warwick.ac.uk/services/vco/record/

*The newly completed Academic Square in 2014. Hi tech science and engineering buildings, hosting academic departments and industrial R&D projects.*

Smaller details are also being transformed – especially in the main social spaces – the cafés (non-retail social spaces having largely disappeared). These photos capture the heart of the 'new' Warwick:

*Representations of grasping student hands. One of two cafés in the Library. A bricolage of everyday artefacts (like this bicycle) and a mismatched mix of "second hand" furniture is used to give a (fake) sense of organic assemblage.*


*Warwick takes its cafés very seriously. The newly refurbished Atrium Café in the main administration building (University House) is typical of the effort that has gone into their visual design.*

Brashly, conspicuously *designed* experiences – in a way discontinuous with more passive and subtle pre-existing designs. This reminds me of something written by Jonathan Chapman:

> "Interestingly, it often takes the introduction of a radical concept – or simply the introduction of an unfamiliar way to undertake familiar tasks – for users to actually stand back and recognize the sheer banality of the objects with which they have been mindlessly interacting up to that point: like listening to some really dire music, you often are not aware of how terrible it is until it stops." (Chapman, 2005: p.14)

Chapman describes exactly the kind of interruption that can lead to a critical-creative response foregrounding design issues and design history, which then re-emerges from the haze of everyday banality.

Perhaps then design and designerliness are reawakening at Warwick University? Yes, perhaps. But as I discovered in this project, it has always been present with often remarkable results – although not necessarily cared for sufficiently or made the most of in the grand scheme of things. And the new *official* designing is not necessarily well connected to the more *everyday* forms of designing or to the radical *guerrilla designing* of our most interesting innovators.

My aim is to connect, or reconnect, the making of the University (at different scales) with the designerly world-view as it appears in diverse forms of designing (craft, professional, everyday and guerrilla), allowing for new more open and successful forms of participation in the remaking of the University.

## 1.3 Inspiring and disrupting ideas from HE

But it seems a massive undertaking. The necessary tasks are each daunting and more so in combination: the tasks of defining the designerly world-view (which is itself evolving), understanding the present workings of the University (evolving even faster), and developing and evaluating working interconnections between the two dimensions (inevitably introducing non-linearities between the evolution of the two dimensions).

Fortunately there are some shortcuts to be found in the form of historical and political vectors that draw people together in recurring mutual consternation and creativity. There are eloquent commentators already defining these tropes from a combination of direct experience, academic research and theorizing (that's a long-hand way of saying there are smart voices in the community with their fingers on the pulse). These perspectives are, I argue, reframing (often unconsciously) the issues in *designerly* terms. That then provides an anchor for the application of the designerly world-view to the University. Specifically, I bring together a set of (I argue) complementary enframings of the task of [re]making the University.

We have already begun to consider **Mike Neary's** reworking of the concept of the "common", ownership, engagement, the student as producer and the learning landscape. This is complemented by **Thomas Docherty's** critique of managerialist thinking and its negation of the playful, anarchic spirit at the heart of the University. Neary's ideas have had a significant impact upon Warwick, through his leadership of the Reinvention Centre - a Centre for Excellence in Teaching and Learning (CETL) based at Warwick and Oxford

Brookes University between 2005 and 2010. Learning spaces and practices were transformed by the Reinvention team, and their influence is still strong today. In 2010 the Warwick part of Reinvention transformed into the Institute for Advanced Teaching and Learning, following a merger with Warwick's other CETL, the Creativity and Performance in Teaching and Learning Centre. CAPITAL had a focus upon teaching and learning as physical performance. It introduced exciting new design possibilities and challenges, complementing Reinvention to great effect. **Carol Rutter, Nick Monk and Jonathan Heron** of CAPITAL have been especially significant in my research (a more detailed account is given in the main body of this thesis).

**Ronald Barnett's** analysis of the University as increasingly "supercomplex" is also of great importance (a pre-eminent characteristic of the design challenges facing the University). Barnett introduced the term into the debate concerning the current state and the future development of higher education in 2000, in his article on "Supercomplexity and the Curriculum" (2000b) and the book *Realizing the University in an Age of Supercomplexity* (2000a). His concept fits well with concepts of complexity in design research and practice, and the roots of those disciplines in systems theory (including Herbert Simon and Walter Buckley) – but the connections are not made explicitly in his texts. What then does he mean by the term? Barnett's supercomplexity is not just a matter of scale or speed, a complexity that may be tamed by increasing the computational power upon which we run our administrative processes:

> "A *complex* world is one in which we are assailed by more facts, data, evidence, tasks and arguments that we can easily handle *within*

> frameworks in which we have our being. By contrast, a *supercomplex* world is one in which the very frameworks by which we orient ourselves to the world are themselves contested." (Barnett, 2000a: p.257)

Barnett follows Jean-François Lyotard, seeing this as the producer and the produced of a post-modern turn towards *performativity* and away from *knowledge*. A hall of mirrors in which "…we find a sense of individuals having to take onto themselves responsibility for continually reconstituting themselves through their lifespan." (*ibid.* p.258). For Barnett, there has been a fracture within the unity of "being, knowing and action" or "ontology, epistemology and praxis" (*ibid.* p.263).

Consequently, the 'things' from which universities are woven (consciously) or amassed (unconsciously) are composed from multiple frames of reference and multiple agencies, interacting consciously and unconsciously in a potentially chaotic *becoming*. A growth in scale and global reach may have the effect of increasing the range of different frames, and hence of super-complexifying the combinations. But it is not in itself the source of supercomplexity.

Supercomplexity occurs when there are diverse agents working together in events defined through multiple frames, co-adapting, and producing yet more frames. For Barnett, this presents a disruptive challenge to conventional curriculum designs, which become fragmented and overloaded with agendas (for example, concerns for employability are co-present with concerns for

individuation and creative freedom, and co-present with a concern for academic integrity). Supercomplexity is useful in defining design challenges faced in the University, but also the consequences of designing, which may sometimes produce additional complexity – supercomplexifying.

Calls for greater participation and flexibility in the design of higher education (as seen in Neary and Docherty) might be perceived as threatening to unleash yet more supercomplexity. Barnett's response to this is a thorough investigation of the conditions that enable and sustain effective flexibility in higher education design, including epistemic flexibility. In his 2014 report on his flexible learning project with the Higher Education Academy, Barnett states that:

> "A focus – of the kind we are seeing in the UK – on systems redesign and responding to the student-as-customers may paradoxically act as a brake on developing the kind of flexible pedagogies that are necessary in this fluid age." (Barnett, 2014: p.9)

Instead, he argues, the focus should be on attitudes, cultures and skills that enable people (staff and students) to work and learn more flexibly. In the terms of this thesis, that means enabling them to become better designers of their own teaching and learning.

**Margaret Archer's** recent work on reflexivity (2003, 2007, 2012) may be interpreted within the discourse on the making of the University. In Archer's work we see a repurposing of the University by its members – with more or

less conscious direction, impact and success. These variations are influenced by various ways of being a reflexive agent in the world. This is covered in more depth in chapter 2.2.5, where the role of reflexivity in designing is considered as an additional variation in mode of reflexivity – a kind of reflexivity that is aware of and able to deal with supercomplexity and the supercomplexifying effects of designing.

My own perspective contributes alongside these academic inputs, as an academic technologist developing (or at least aiming to develop) the University as a joined-up digital and physical platform for teaching, learning and research. This has been influenced by the work of **Robert Ellis and Peter Goodyear** on *Student Experiences of E-learning in Higher Education: The Ecology of Sustainable Innovation* (2010) – with an emphasis upon the ecological dimension (the title of the book is a bit misleading, the second half of the title is a more accurate description of its contents).

And finally, the most important inspiring influence for my research: the staff and students of the University of Warwick, who's many interesting stories are contributing to the remaking of the University, and which are the subject of this thesis. The most significant of these influences being the **Arts Faculty E-Squad** and the extended network of students that developed around the Media Suite. In 2007 I established the E-Squad as a team of undergraduate students who would help staff around the Faculty with digital projects, but also to develop staff and student capabilities. This worked well. The students developed their own creative industries network within the University, and several companies have since developed from that network. It was entirely

their own creativity, intelligence and social-entrepreneurship that made this happen. I provided the facilities (a room full of Apple computers and video cameras[20]), and support whenever needed. They did the rest – which was substantial and impactful. However, this also gave me continual opportunities to observe a designerly creative and entrepreneurial network in operation, contrasting with the more usual *managerialist* ways in which the University works. The E-Squad and the Media Suite led me to conceive of the idea of *guerrilla designers* – people working in roles that are outside of the normal scope of *professional designers,* often voluntarily, to use designerly ways to change the institutions in which they are embedded. I then discovered and worked with many other such guerrilla designers – students and staff – with the Media Suite being a honey-pot attracting all kinds of interesting people (a special mention is due to **Nathalie Dalton-King and Rob Batterbee of the Undergraduate Research Support Scheme**). This research project developed out of the observation of these contrasting methods.

These ideas and influences, and more, get reframed through the designerly world-view. Only then can we go on to think about how they might be tackled as *design challenges* by the people who are in a position to tackle them – and that itself is a matter of understanding their usual ways of *designing*, and how those ways might enable and/or constrain progress. And finally, we can then consider how a more *designerly* approach might work better in helping us to address these design challenges.

[20] Funded by the Higher Education Academy through my National Teaching Fellowship.

## 1.4 The iterative structure of the project

This is an unconventional form of research. The project was "managed" using the same iterative and agile techniques that we use for our software and service development projects at Warwick. The workings of the resulting thesis will most probably seem unfamiliar. A simple explanation of its structure is therefore necessary, so as to guide the user through its complexities – although it has to be admitted that the eventual structure of this thesis is a narrative fiction constructed for the sake of simplicity.

To pin things down for the purposes of a PhD, along the way a single question has been present. Although it contains terms that could each constitute a major research project in themselves. The question is:

> How does design thinking transform our understanding of and capability to [re]make higher education in an age of supercomplexity?

"Design thinking", or *designerliness* refers to the world-view. "Higher education in an age of supercomplexity" is that which is viewed through the lens of "design thinking" – although in reality the link between the two halves is circular, with the concepts of supercomplexity and learning being linked to concepts of agency that in turn lead to designerliness (via Herbert Simon, Walter Buckley and complex adaptive systems theory); and the return journey made from design as we know it today, which is inseparable from the supercomplexity of the world in which we design, to supercomplexity and learning.

Furthermore, design thinking's mode of knowing, the means by which it understands the world, is a hands-on form of *knowing through transforming, through [re]making.* Therefore, the two elements "understanding" and "capability to [re]make" collapse into one. Donald Schön's concept of the *reflective practicum* is especially useful in understanding the nature of this epistemic system.

This PhD is itself a reflective practicum. Philosophical and designerly.

Any attempt to crow-bar this into a simple and more conventional structure would betray the richness of the question and the domain to which it applies (higher education, and more specifically, the University of Warwick). The research therefore developed as a more complicated set of inter-linked and overlapping transdisciplinary studies.

However, the thesis needs to be readable so as to achieve *fit, stick, spread and grow* – its declared aims. With this in mind, it presents a sample of the most interesting and most significant work - edited down from over 150,000 words of text. Some of the sections that have been omitted from the final version have been published online as working papers in Warwick's WRAP open access repository. Some elements of these published working papers have also been included in the final version.[21]

[21] My research has been supported by my employer, the University of Warwick. I have therefore in return published some material that will be of immediate benefit to the wider community. WRAP OA articles may be found at: http://wrap.warwick.ac.uk/view/author_id/9124.html

Much deliberation went into the ordering of the content. Would it be better to give a full account of the Design Thinking strategy (and my fresh interpretation of it) first? Or could the exploration of the supercomplex university lead naturally into Design Thinking as a solution? In reality, both parts emerged simultaneously as investigations and reflective exercises conducted at the same time and feeding-off each other.

Much of the work of the project has involved developing and applying concepts (with a philosophical method[22] but in a designerly way) according to this emergent *designerly world-view.* In the main body of the thesis, core concepts relating to design, designing and designerliness are defined, so as to form a framework for the subsequent text, and to make more concrete the assumptions on which my design research is based. This work is divided into five chapters:

1. Design.
2. Designing.
3. Designers.
4. Challenges in managing design capability.
5. Strategies for more designerly designing.

Each chapter takes a wide range of sources and, through philosophical and practical work, produces concepts that build the overall framework for the designerly world-view. Within each chapter, these ideas are applied to the University, drawing upon interviews and my *observant participations* of

[22] My philosophical background is of the post-Kantian tradition following Nietzsche, Bergson, Deleuze and Guattari – see O'Toole, 1996.

designers and designing at Warwick. Over the course of the five chapters, this fulfils the aim of viewing the University through this fresh perspective.

The framework is that of fit, stick, spread and grow (FSSG) – where these four terms indicate four aspects of design:

- finding fit with things as they are now and as we would like them to be;
- sticking in place for a reasonable length of time;
- spreading to other uses and other users;
- enabling further growth in our capability for effective designing.

It includes an account of "agency" and its relationship to "structure" through *designerly* and *non-designerly* concepts and practices – recognizing that neither agency nor structure are simple concepts, and that *designerliness* is an emergent phenomena continually in development through its non-linear conversation with the ever-changing designed and non-designed world in which it is embedded and upon which it reflects. This formula is recognizably influenced by the philosopher and design researcher Donald Schön.

This does not represent a single established paradigm in design theory or practice. Rather, it draws from a range of disciplines and perspectives to make sense of what might otherwise be encountered as an increasingly complex and fragmented idea. It is a *transdisciplinary* effort. Out of this conceptual work, the most significant conjecture is:

**The world is an increasingly design-intensive place, lived-in as a meshwork of environments, platforms, devices and (more-or-less designerly) *everyday designers.* As such, we make the most of the opportunities available, so as to develop and address our *concerns* by working on *projects*, and using an evermore diverse range of *practices* through *designed assemblages*.**

From the outset the focus taken is not simply upon individual design innovators as the source of change, but rather upon the broader dynamic assemblages and platforms from which design innovations emerge, and in which design innovators, with their distinctive ways of thinking and doing, work as catalysts, conduits and accelerants. My research developed from a more constrained view of design and designing in higher education, focussed upon *pedagogic design*, to a more open and complex appreciation of what matters in higher education designing and who undertakes that work – this "explosion" in the scope of my research followed encounters with the Reinvention Centre, the CAPITAL Centre, the Institute for Advanced Teaching and Learning, the Student as Producer movement, the students of the Arts Faculty E-Squad, the Undergraduate Research Support Scheme (URSS) and many other such extraordinary initiatives – people who are continually rewriting the rule-book for higher education and its design. This then leads to an assessment of higher education as being supercomplex and supercomplexifying in a supercomplex world (following and extending Ron Barnett's turn of the century critique).

Supercomplexity and design for supercomplexity is a theme that runs through

the five chapters. The supercomplexity described by Barnett has positive, negative and un-decidable implications – and as will be seen, many of the design innovators encountered in this study are well aware of these challenges, and are working-out ways to make the most of the opportunities on offer, often in a powerfully *designerly* way. New concepts and practices of *common ground* and *platforms* are found to be especially significant.

However, at an institutional level, design innovation strategies are not yet well defined and developed so as to ensure fair, inclusive and consequently effective participation in the [re]making of the supercomplex university by communities of designerly agents (staff, students and others), working with professional designers, design concepts and methods. Although as this thesis is being finalised (in late 2014), positive steps towards such a strategic approach are being made.

This work deals with what is sometimes called *design thinking* (an early use of the term is found in Buchanan, 1992). The Design Thinking (capital D, capital T) approach popularised since 2008 is related to this, but has a different purpose and emphasis. In chapter 2.5.4 (on strategies for more designerly designing) I describe how Tim Brown and his colleagues at the IDEO design company turned their own experiences of designing under supercomplex conditions into a strategy for widening access to design opportunities and design capability to people who are most often excluded from conventional design practice. It is what I call *the designerly turn.* I explore this *strategic* approach and its methods, and consider its usefulness in addressing the challenges described chapter 2.4, given the forms of

designing and design capability described in chapters 2.1 to 2.3. This concludes with an as-yet untested strategy for building more effective and more evenly distributed design capability in the university, with a focus upon the design challenge: *how do we transform the 20th Century university into an ecosystem built around the flexible digital Extended Classroom?* The thesis generates a project design, and eventually (beyond the scope of the research) a project, which if well designed (informed by the research) will transform the University.

This is then an unconventional, 21st Century form of researching.

## 1.5 What/who is this research concerned with?

The designing of *higher education* by its participants is my subject – although it inevitably overflows these boundaries as actors, their networks and their ideas are followed in and out of an institution with increasingly porous boundaries. Rather than starting from a global view of higher education as a national or international system, I focus-in upon changing people and practices at a local level – starting with the University of Warwick. As will be seen, there is a colloquial aspect to this. But I argue that the powerful forces that are reshaping the University and its means of production come from outside of the University (but are in turn shaped by universities). At the level of the University, I do not start from the institutional perspective, in which the University is defined as organisational structures and buildings into which life is poured. Rather, the University is taken to be a rich and ever changing meshwork of many different assemblages (combining practices, projects and concerns) produced by its participants through complex material and ideational processes.

As will be seen, I both argue for *and* actively implement an idea of research as the production of knowledge, or *knowing* – not as an abstract property held in the databanks of an institutional repository, but as research that finds its sense, its grounding, in networks of embodied and situated human beings who, where opportunity affords, are co-researchers and co-designers alongside me.

My research seeks to know its subjects and objects not as abstractions

represented from afar, but rather as engaged intimately with their dispositions and capabilities for knowing, being, acting and feeling *in the world* – as part of their individual and collective *reflexivity* and *agency.*

I am interested in people and collaborations in academia with dispositions and capabilities for knowing, being, acting and feeling in a particular way: a *designerly* way. This is neither a fully-theorised generic type, nor is it a finitely determined class of beings. Rather, it is a disposition and a set of capabilities, inseparable from history and agency as it is today, but with a potential to grow in extension (membership) and intension (meaning) – indeed a potential to create ways of being (as constellations of concerns, projects and practices) that *fit, stick, spread and grow* – successfully *designed*.

# 1.6 What approaches have been used?

## *1.6.1 A patterns-based anthropology of designing*

I started in 2009 with a relatively *ad hoc* approach, using a variety of methods so as to make the best of the many opportunities available to me as part of my various roles at the University of Warwick.[23] This evolved into a more deliberate *anthropology of designers*, especially informed by Lucy Suchman's paper "Anthropological Relocations and the Limits of Design" (Suchman, 2011) in which she describes her studies of teams of designers in high-tech industries. As with commercial research labs, in higher education:

> "…encounters happen within circulatory systems characterized by specific moments of place-making and transversal movement, processes that we are just beginning to articulate in ways other than through the simple tropes of local knowledge or global flows." (Suchman, 2011: p.2)

Suchman's statement "that we are just beginning to articulate" how these things work, points towards the many difficulties to be encountered in writing an ethnography of highly decentred and diverse systems for the generation of innovations, in which:

- actions with major consequences may happen in numerous places at unpredictable times,
- and then diffuse through often subterranean routes.

[23] Throughout the duration of the project, I have continued with my role as Senior Academic Technologist with IT Services, as well as duties as a HEA National Teaching Fellow.

In response to these difficulties, Suchman pursues the "framings" that are repeatedly employed by people in such situations to tame the complexity:

> "It is this question of the situations that frame design, and the frames that condition professional practice, that comprises the grounds of my own engagements." (*ibid.* p.6)

Are there, for example, patterns of problem/strategy/solution that are repeatedly used and which become the currency of helpfulness and insight in a community? – or perhaps, around which experts form territories and hierarchies? That then became my research question for Part Two of the thesis (emergent patterns of design, designing and designerliness).

Suchman's aim is to discover and illustrate diversity and complexity in the process of innovation, so as to prevent the "reproduction" of:

> "…the neocolonial geographies of center and periphery, and temporalities of technological development, that in the mid-1990s underwrote the Silicon Valley's figuration as central to the future of everywhere." (*ibid.* p.2)

…reproduced through a circuit that might run from ethnographies that assume such geographies (of centre and periphery), and which then valorise such power structures as normal within an unquestionably powerful and successful industry. And consequently, reinforce such patterns as *the only game in town.*

This seems to be equally applicable to higher education, where narratives of centre (the administration) and periphery (academia) abound, with further

micro-geographies of centre (academic discipline) and periphery (interdisciplinary studies) hidden inside like a set of Russian dolls. And furthermore, in the historical dimension, I have heard narratives that divide people into “early-adopters” and “laggards”. Narratives that might serve to reproduce neo-colonial, patriarchal and elitist vested interests.

Suchman’s approach might then establish the groundwork for a way of rethinking, and ultimately remaking higher education that breaks away from these narratives by recognising the real source of academic production, value and virtue.

But what should I be looking for? How might these framings become visible? In professional design practice, they are sometimes explicitly formulated as *design patterns* – something that I am familiar with in my own design and software development practice. A design pattern is a simple, abstract, but easily implementable arrangement of design elements that may be adapted into a solution to a variant of a well-known problem. The term is said to have originated with Christopher Alexander in his *A Pattern Language: Towns, Buildings, Construction*, 1977.

A design pattern is a **statement of a problem** plus a **pattern of actions and interactions that addresses the problem** with **links to related patterns** (including patterns that are used in the pattern, and patterns that use the pattern, forming a *pattern language*), elaborated with **information on its originating context and the concerns, values and problems out of which it arose** and **advice on implementation and customisation**. The pattern is

usually headed with a **catchy and meaningful title**. In some disciplines the inclusion of diagrams and images is considered essential. In education, this might be best achieved with a **storyboard** or even a **video**. All of these elements are intended to act as **a guide to design activity and a prompt for thinking and prototyping**. Here is a simple example pattern:

***Enriching Personal Tutor Meetings with E-portfolio-based Narratives***

It is hard for a tutor to get a joined-up view of a student's work and experiences. At the same time, many students struggle to improvise verbally a reflexive narrative with evidence in the time-constrained and potentially stressful context of a tutorial.

In this pattern, the student creates narratives in advance from a rich collection of materials. This can be viewed in advance of the meeting, and in the meeting itself.

Over an extended time-span a student creates and maintains an electronic collection and presentation of resources and information about themselves and their work. That is an e-portfolio. It can focus upon one aspect of the student's activities, for example a specific module or project. Or it might cover larger scales and collections of activities (a whole degree programme, or even a whole lifetime). A wider-scoped e-portfolio (course) might contain a collection of more specific e-portfolios (modules). At meetings with their personal tutor, the student presents selected aspects of their e-portfolio, combined

into a reflexive narrative about their choices, actions, plans and progress.

There is a danger that the e-portfolio and the student's narratives will be skewed by the fact that digital text based materials are easier to collect. Extra technical and skills work may be needed to help with other formats, such as audio, video, still images and combinations of media.

Anti-patterns are defined as "a common response to a recurring problem that is usually ineffective and risks being highly counterproductive".[24]

Might there be such patterns behind design activity in the University? Could they be the medium by which design ideas spread and fresh designing finds its starting-points? Or perhaps there are nascent patterns on the cusp of being formulated? And maybe there are cases where clearer, more distinct patterns lead to successful designing? Perhaps if I were to observe and interview successful design innovators I might find framings via patterns playing a significant part in the [re]making if the University? Or alternatively, if there seems to be a mismatch between pattern-based design thinking and how people actually work in the University, what does that tell us? Why this mismatch?

[24] The Wikipedia article on Anti-Patterns, which lists many well known cases - http://en.wikipedia.org/wiki/Anti-pattern

### *1.6.2 Design anthropology*

As I made my way around the University, I quickly discovered that my naïve expectations concerning design patterns where not going to give me the straightforward account of designing and designers that I hoped for. There simply were very few clearly identifiable patterns, little beyond the mundane (lecture, seminar etc.). My interviewees (successful practitioners and innovators in teaching and learning) did not describe and seemed resistant to describing their design innovations in terms that resembled patterns. Instead I heard complicated narratives with much detail about the struggles and adjustments made over time. Trying to shoe-horn these accounts into patterns seemed quite wrong.[25] And following that, I would not easily be able to assess the fitness of the Design Thinking strategy within this domain. The real situation seemed far more messy and *ad hoc.*

My approach then evolved into what has been termed *design anthropology*. In their introduction to the recent volume on this emergent methodology or discipline (Gunn *et al.* 2013), Ton Otto and Rachel Charlotte Smith make the connection between design and anthropological practice:

> "…there appears to be a genuine affinity between design and ethnography as processes of inquiry and discovery that includes the iterative way process and product are interconnected and the reflexive

[25] This mismatch, and my attempts to make patterns out of the *ad hoc* are documented in more depth in my working paper on "Innovation and design change strategies for learning technologies at Warwick" at http://wrap.warwick.ac.uk/56684/

> involvement by researchers and designers." (Otto & Smith, 2013: KL 257)

In their paper from the same volume, Gatt and Ingold argue that conventional ethnographic approaches, or *anthropology-by-means-of-description* (ethnography), are of limited use under such supercomplex and rapidly evolving conditions. They describe an *anthropology-by-means-of-design* following the principle of *correspondence.* Anthropologists facilitate or create opportunities for their subjects (who are co-researchers and co-designers) to design useful new things, systems, practices etc. They work with participants, expanding their *design capabilities*. And as an essential element of such capabilities, they apply and develop the designerly capability of reflexivity. Through designing, participants are able to better describe their world as it is today, with its constraints and enablements – and perhaps then a richer design language, with well-known patterns might emerge. Decisions made in the design process can lead to new understanding and new knowledge, shared between the participants and the anthropologists. In this way, there is a "correspondence" between the design project, the shared knowledge and understanding, and the wider world in which it is embedded. As Otto and Smith state in their introduction:

> "A new criterion of success would be how design anthropologists are able to correspond and collaborate with people as co-creators of desirable futures and to be the facilitators of knowledge and meaningful practices that transform the present." (*ibid.* KL 493)

As I discovered in my own attempts at an ethnography of higher education, the complexities and subtleties of such a supercomplex domain may be both invisible to its participants (who are very busy people) and to the lone anthropologist.

But the domain is also supercomplex in a second dimension – that of time, requiring what Gatt and Ingold call (in the title of their chapter) “an anthropology in real time”. The *correspondence* between participants, researcher and the design is enframed in the temporality of the prospects for the design-in-use, and its subsequent evolution (or at least, the collateral affects that it has even if it does not make it into everyday use). It is a fast evolving world full of uncertainties, including uncertainties about how we go about dealing with intensely changing circumstances and opportunities. Knowledge about the world as it is, both the knowledge of participants and of the researcher, cannot be separated from conjectures about what it should become, how it might be designed *better*. In bringing clarity to that knowledge through *design anthropology* we are engaged in working through questions of good and bad: the ethical dimension. As Bruno Latour argues, the inevitable ethical engagement gives the concept of “design” real value to the researcher and to actors (Latour, 2008: p.2 – more on Latour’s arguments in Chapter 2.1). For these reasons, I appreciated the value of getting my hands dirty with a much closer engagement in the design challenges of the domain I was studying. There was a subtle shift from ethnography by interview, through participant observation to what Gatt and Ingold have called “observant participation”:

> "Although any participant observation is a practice of correspondence, anthropology-by-means-of-design takes participant observation one step further: it becomes observant participation." (Gatt & Ingold, 2013:KL 3539)

### *Observant participations in the Open-space Learning Project*

As an example of what this extra-degree of immersive engagement has added to my research, consider the case of technology in Open-space Learning (OSL). Developed out of the work of the Creativity and Performance in Teaching and Learning (CAPITAL) Centre at Warwick, OSL is a pedagogic approach that re-situates learning into "open-spaces" – usually in the form of theatre studios "without chairs". The aims, detailed more fully later in this thesis, are to disrupt conventional patterns of student-teacher, student-student and student-self power and knowledge relations. There is an emphasis upon the body, movement, touch and less-constrained vocalization. As part of a Higher Education Academy funded project I had been given the task of introducing digital technologies into OSL. It proved to be quite challenging. All of the obvious innovations were resisted by OSL practitioners.

My strategy then was to get a more immersive understanding of OSL from the inside, becoming a practitioner (as both a student and as a teacher). For an emotionally and physically reserved Englishman, this felt *risky*. And from inside the OSL workshop, I could get an understanding of just how risky and fragile it can seem to be – for many, it is threatening. A skilled and caring teacher is the key. That then gave me a sense of why the addition of new technologies might be a problem. But becoming a practitioner and co-designing OSL workshops gave me further insights. I could then see how the

design process, individual design decisions, are "framed" (as Suchman would say) by a set of concerns and values – an OSL sensibility. OSL has theatrical origins. The OSL workshop *works* as a kind of spell. As with Shakespeare (who through Carol Rutter is one of the key inspirations for OSL), the spell has a powerful hold, but the master practitioner knows just when and how to break it so as to provoke the essential reflective/reflexive moment.[26]

With this realization, this knowledge of how to frame design decisions for OSL, I could then understand better the *designers* and the *designing of* Open-space Learning. But not only OSL. Its practice and practitioners are a hybridization of other more conventional forms of academia with the theatre. I could then consider whether similar but different enframings occur elsewhere in higher education practice.

### *Observant participations in the Media Suite*

I set up the Media Suite at Warwick so as to give students and staff opportunities to experience creative production in ways that they would not normally have come across at Warwick[27] (in 2008 film making was a rare thing, and few other facilities existed on campus). However, it was also an experimental *reflective practicum* (in Schön's terms) allowing me to observe an especially important phenomena in action: the generative idea and its role in creativity and design. Generative ideas are usually simple ideas,

[26] As in, for example, Prospero's "this rough magic I here abjure" (*The Tempest,* Act 5, Scene 1).

[27] The Suite was open (through an online booking system) to anyone in the University. It was used by students and academics from all faculties. Students and academics would work in the Suite at the same time, with support and ideas passing around all of the participants. Students used it for dissertations and special projects. Staff often used it for "research impact" work. It was integrated into taught modules in Chemistry, Politics, Theatre Studies and Creative Writing.

sometimes only preliminary, around which briefs and design ideas develop, design knowledge is formed and projects are given focus and energised. In the Media Suite I could observe how different people discovered-invented and used their generative ideas in different ways for different ends and with varying degrees of success.

The Media Suite was equipped with video cameras for loan (managed by the CAPITAL Centre and later IATL) and five Apple iMac computers, running Apple's powerful, but simple, video editing application iMovie (amongst other applications)[28]. In addition, the CAPITAL/IATL contributed additional cameras, radio mics, MacBooks and iPads that could be used by staff and students in teaching and learning outside of the Suite. The nearby Writers' Room proved to be an ideal location, and on many occasions I moved the entire contents of the Suite into it for projects involving groups of more than ten people. Between 2009 and 2013 the facility was used by representatives from every University department. This is a short-list of memorable users, giving a sense of its range:

- Professor Kevin Butcher (Classics) created a series of videos about Roman coins, to illustrate the approach used in Classics at Warwick – with some footage filmed on location in the Lebanon.
- School students from around the world created campaigning videos as part of the International Gateway for Gifted Youth (IGGY) summer school.

[28] Funded by my HEA National Teaching Fellowship award.

- Students from the undergraduate module on screenwriting, part of the Creative Writing Programme, created short fictional movies – adding a practical opportunity to relate scripts to real films.
- Theatre Studies students produced a wide range of videos for use in performances and installations – for example, Catherine Allen and Laura Cameron created a spiral of MacBooks descending from the theatre studio ceiling for Theory Roulette.
- All first year Chemistry undergraduates produced films illustrating health and safety issues in the laboratory – many taking a humorous approach to the topic, most notably with dancing Einsteins.
- Margaret Shewring (Theatre Studies) and Ronnie Mulryne (Emeritus Professor of Renaissance Studies) produced audiographic presentations.
- Undergraduate Research Support Scheme students created films and web sites as part of their research projects.
- Warwick Business School students recorded short reflective responses to experimental teaching sessions led by Grier Palmer as part of the Open-space Learning project.
- Politics and International Studies students following Renske Doorenspleet's module produced challenging and campaigning videos about democracy.
- The SIBE student social-enterprise group ran an online TV channel, live events and created documentaries.

*An image from Telepresent Tehran – a video conference with the Iranian film maker Haleh Anvara, organised by Annouchka Bayley as part of an interdisciplinary module on verbatim theatre, using the Media Suite facilities in the CAPITAL Studio.*
*http://www.warwick.ac.uk/openspacelearning/technology/case_studies/telepresent_tehran/*

## 1.7 Grounded in experiences and observant participations

My research focuses in on small details of complex assemblages and events, composed from many much larger networks of things (both designed and emergent). It is *small research*, zoomed-in to a very specific *now* and *here*, but with (I hope) a *massive potential* for impact through the *network effect* as its concepts become valued across that network. The test of its veracity then is not in its potential to master and subsume huge quantities of crude data, but in its ability to make many small connections and to activate neuronal transmission and subsequent action through many people across an ever-widening network – and then to trace these connections and transformations as they extend over time and space, and are themselves reconfigured in different contexts.

In this way, ideas and practices were traced through a set of interconnected networks in and out of the institution, including:

- The Arts Faculty E-Squad (a team of undergraduates undertaking creative and technological development work with academics) and the wider collection of students and teachers connected through the E-Squad's physical base in the Media Suite.
- Winners of teaching excellence awards at Warwick, National Teaching Fellows and other innovative teachers.
- Students, mentors, researchers, designers and administrators connected through the Undergraduate Research Student Support

scheme (URSS) at Warwick – this forms one of the most detailed cases for the research.

- A broad and diverse range of people connected to the strategic projects (and experimental teaching spaces) of the Reinvention Centre for Undergraduate Research, the Creativity and Performance in Teaching and Learning (CAPITAL) Centre, the Institute for Advanced Teaching and Learning (IATL), the Learning and Development Centre (LDC), the Learning Grid and the Teaching Grid, and the Academic Technology Service – Warwick has a complicated meshwork of agencies, with overlaps that encourage users to move between them, albeit in a relatively uncoordinated manner. This lack of structure or hierarchy presented the research with a useful opportunity: what would *designerly* agents make of the complexity? Would they be more effective at joining together the offerings and opportunities?
- An even wider and more diverse set of people encountered through my work as an academic technologist with the Academic Technology Service.
- A newly emerging network, including architects, connected to the redevelopment of the University of Warwick campus, and especially the proposed Teaching and Learning Building (early design stages by June 2014).
- Touch Press, a world-leading creative industries company, with alumni links to the Reinvention Centre and Arts E-Squad.

My original focus when deciding to do this research was on the Arts Faculty at Warwick (which encompasses some humanities subjects, languages and to a

much smaller extent the creative aspects of writing and theatre). My concepts of design and designing emphasise the essential creative and aesthetic aspects – designing being an emergent conversation with materials and contexts. But that did not constrain my studies to the Arts. In fact I discovered designerliness across the board, and most interestingly, in the Warwick Medical School.

Consider for example the case of Professor Peter Abrahams (now *emeritus* with Warwick Medical School), who I interviewed about 'innovative' teaching methods. Abrahams is a world-leading expert on anatomy, a Higher Education Academy National Teaching Fellow, and an amateur film maker. He is also an irrepressible performer on stage – in three theatres: operating, lecture and dramatic. Abrahams makes movies and iPad apps (he features in the global hit *Leonardo da Vinci: Anatomy* from Touch Press). When I met with him in 2011 he had just returned from a trip to the Pacific Ocean, where he had been filming a free diver underwater. The aim was to illustrate the extraordinary capabilities of the cardiovascular system. Not simply to get the facts across, but to engage and inspire the trainee doctors with an outstanding and memorable experience. During the interview, Abrahams described and demonstrated several other methods, including his famous "intestinal apron" trick - a long apron, in the style of a cook's apron but much longer, with an expanded diagram of a human's intestines printed onto it. This would be rolled-out when on stage lecturing to students who might otherwise be less than entirely engaged by the topic. Peter Abrahams, then, uses theatrical methods, which border upon the arts and humanities. But there is more to it than that. He encourages students and other teachers to follow in

his path, to use visual and performative methods to aid their developing understandings and their collective discourse. The work on Leonardo da Vinci, including the app, a book and an exhibition, are working to get medics, and scientists more broadly, to re-consider the role of art and the imagination in their work. That is very much an arts and humanities way of thinking for the purpose of medical education.

The concerns, projects and practices of these many diverse people intersected in events and at a distance, through social networks and diverse media. My research added to this, with interviews and participant observations (or as design anthropologists might say, observant participations), and with fresh perspectives and concepts – collecting fragments as text, images and audio into the almost unlimited memory that is my Evernote digital notebook *in the cloud.*

### *1.7.1 Research ethics*

In carrying out the research I complied with University of Warwick ethical approval procedures. However, there are wider issues that are worthy of exploration. The move described above (1.6) from a descriptive "patterns-based anthropology of designing" to a more active "design anthropology through observant participation" altered the ethical considerations essential to the project. However, this occurred within the already well established ethical framework in which I work as an academic technologist, embedded in a community of practice for whom the interests of students and staff are paramount and continually reflected upon. The ethical judgements emergent within the practice of observant participation were continually informed by this

community, and where necessary, through confidential discussions with a small group of mentors (following our normal working practice).

As a further positive outcome of the project, the *ethical capabilities* of this community have been enhanced by my research activities – contributing to a more mature and clearly defined understanding of the role played by design values, as found in my *fit, stick, spread and grow* framework. The consideration of design fitness, for example, concerns the fitness of designs and designed practices (including designed research practices) to the people they are created to serve (which in this case includes students and staff) – their practices, capabilities, developmental pathways, values, needs, ambitions and rights. This heightened awareness requires a more participatory approach, and informs design decisions for more sensitive and inclusive designing. In this way, throughout the research project (and as a reason for its undertaking) research ethics considerations and accompanying values and practices have developed to enhance our collective ethical capabilities as a key element of design capabilities – research ethics and design ethics are intimately related. In this project, given my already well established position in the organisation, perhaps it would be impossible to separate these dimensions. A more disconnected and "scientific" approach could have been taken with a different organisation, but then I would not have had access to such a rich and varied range of people and cases – and would in the end have produced research with less chance of practical impact.

With the more straightforwardly descriptive approach, the assurance of *fair and accurate representation* is paramount – although it is never perfectly

resolved. This is notoriously difficult in relation to the reactions people have to novel events. For example, a student participating in a radical Open-space Learning activity. When interviewed immediately after the activity, they might react negatively. When interviewed two years later, after further reflection and experience in the world, their recollection might have changed – perhaps becoming more positive. And then again, even further into the future, they could change yet again. Such representations are therefore subjective, but at the same time they objectively represent a real state of affairs. People have the right to change their minds. In presenting and consuming such research, we need to be aware that representations are “snap-shots” frozen in time and subject to a specific set of framings and filters suggested by circumstance. Furthermore, the very act of taking the snap-shot, which necessarily draws participants and researcher into reflexive dialogue, might alter the development of the memory and any pathways of development linked to the represented event – or even initiate new pathways. This is not to deny that there is an objective reality, or that we can try to be faithful to how things are, but rather it is to accept its ongoing complexity and the non-linear relationship between representation and construction.

In this research project, many varied individuals and entities are represented directly. There are named individuals, academic departments, projects etc. Many others are represented *by implication*. For example, by describing Arts Faculty students as tending towards certain characteristics. And yet more people and entities *might* be seen to be represented through their omission from the text – numerous people were interviewed and consulted in the production of this research, only a small number are named in the resulting

thesis. That does not mean they were unworthy cases, but rather that they did not fit into the flow of the thesis as a text.

These three issues have been addressed as follows:

### *1. Representing individuals by name*

This is a double edged sword. Accuracy is even more important when real people are named. In this research project my ideas were generated through, and inspired by, real people. And furthermore, they are very specific real people. In quasi-legalistic terms, I wish to affirm that much of what is described in this research is the specific intellectual and creative property of the named people. To speak of such work anonymously would be like removing the name of the artist from art criticism, or the name of the author from a work of literary criticism. I wish to consider such people as *designers* and their works as the product of named designers. With regards to students and early career academics, this is especially important. More often than not, they are alienated from the products of their own valuable labours. This research, in recognising their designerly labours and capabilities, campaigns against that alienation.

Where cases are explicitly associated with named individuals, they have been consulted and my recording and interpretation checked in person – although it is possible that over time interpretations may change (as described above). There is an explicit acceptance of this in the relationship between researcher and participants. Within these conversations, the possibility of long-term consequences has been considered (“would you want this version of events

to appear in print?"). Self-censorship was only deemed necessary on one occasion. This has not been too difficult to achieve in these cases, as I am reporting upon good works of staff and students which have often already been publicised through other channels (for example Showcase events). This project has focussed upon a sub-section of University members (and people in the creative industries) who are more open about their activities (and are rewarded for such openness through schemes like the National Teaching Fellowship). In many cases the ethical challenge of this research has concerned the need to fairly and accurately cut through their enthusiasm to get to underlying factors and translate their perspective into designerly terms – but this has been done in a spirit of open-mindedness on all sides.

Should the same principles and assumptions apply to students and staff? Yes and no. I have in fact (as a researcher and as an employee of the University) the same duty of care for all participants. My role as an academic technologist is as much oriented towards developing people as it is towards developing technologies. I am a teacher, mentor, coach, trainer for students and staff. This positioning carries over to my research work. I am responsible in part for the welfare and development of students and staff. We might assume that my responsibilities are greater when working with students (who we might think are less able to see the consequences of actions and to make good choices). But in reality when moving into the unfamiliar world of digital technologies, staff face similar challenges and may be just as confused. Students are often much better at understanding the implications of their actions in the world of digital technologies and Platform Capitalism. It is not a simple picture. Care, consideration and empathy are necessary at all times.

### *2. Assuring a level of accuracy*

Scientific levels of accuracy in describing the organisation and its constituents were not the prime concern of this research, and indeed would be beyond its capabilities at the selected scope and scale (encompassing a supercomplex organisation) – although aiming for sufficient accuracy still matters. The project is first and foremost about the creation of concepts to be used in a certain *type* of context and beyond. Representations are made on a "best endeavours basis" but reported (in the tone of this thesis) in the first person, following a well established philosophical tradition, so as to indicate the imperfections involved in this kind of research.

### *3. The non-representation of participants*

As for the non-representation of participants, all that I can do is to continue to thank everyone profusely, reiterating the collective value of the input of all staff and students whether directly or indirectly involved. The resulting thesis could have been much longer, and richer, with their inclusion. However there are limits.

### *Design anthropology and research ethics*

The descriptive approach is simpler, although may still actively alter the course of participants' minds and lives. For example, in co-creating case study accounts (the method often used in this research) people rethink their actions, experiences, plans and practices. My approach in such cases has been to let the participants speak in their own way, but also to carefully probe how easily their thoughts can fit into a designerly way of thinking, seeking a sense of the distance or fit. This certainly did have consequences for some of

the participants – giving them an altered perspective from which they could *selectively* view matters. In all of the cases where this happened, the participants acted as intelligent and critical agents making their own judgements (it being a University, that seemed inevitable). The *design anthropological* approach introduces more complexities beyond the straightforwardly descriptive approach – although the difference is not as great as that between a *scientific-objective* stance and *participant observation*.

Imagine the consequences had I myself commandeered a taught module, as part of a formally assessed programme contributing to the degree classifications attained by its students (I did not in fact do this, but it might happen in the future). This could have been an optional module, explicitly described as a course in design thinking, perhaps as an interdisciplinary module hosted by the Institute for Advanced Teaching and Learning (IATL). In that case it would have been filtered and shaped by the quality assurance processes of IATL and the central Teaching Quality office. If my declared intentions were to use the module as a research opportunity, exploring some new aspect of pedagogy (as is often the case) then IATL would act as the *de facto* ethics board for the research. The same should be expected of any other academic department. If I proceeded with the research without such declaration and approval, I would be acting dishonestly. Even with clearance from the approving bodies (e.g. IATL), the research intentions should be declared to the students in advance of their choosing to join the module. And further along the line, we must continually ensure that they experience the module without prejudicing their chances of success (for example, George

Ttoouli catered for this in the design of his very radical experiment reported in 2.1.2 below).

Following these tight ethical principles, pedagogic research becomes a lot more complicated than we might at first expect. For example, students may be more likely to properly engage with an innovation (the subject of a research project) if their involvement has real consequences for their degree outcomes (or some other significant goal). But if we have students working in a module that is dependent upon a pedagogic innovation, how do we give them a way to excuse themselves from being research subjects? In the academic technology and pedagogic enhancement business we often deal with these ethical complexities.

In this research project I carefully avoided such problems through a series of compromises and strategies that gave me *good enough experiences* covering a wide range of cases, sufficient to feed the development of my ideas and evidence base. That is in reality how we build knowledge and make judgements concerning pedagogic innovations – rarely by direct, impactful but high risk experimentation (although as documented in this research, such experiments are sometimes undertaken *carefully*). Instead, my research piggy-backed upon the work of others, and their good management of ethical issues. My intentions were to see designerliness in operation in the wild through many different frames and filters, not in modules concerning design practice. That in itself meant a less direct kind of action/design research. Not a direct intervention, but many smaller actions and observations across many different contexts. In most cases I relied upon pedagogic innovation and

research projects sensitively managed by well established academics in academic departments that provided safe managed contexts (IATL also does that job). In other cases students (such as the SIBE group) used my facilities and support as they needed me, and in return (but not by obligation) contributed to the development of my project. One of the remarkable aspects of this research was the sophistication with which students like the E-Squad and SIBE approached ethical issues. In the case of SIBE, an ethical capability was built into the design of their organisation, and was transferred to new members through formal training events. When dealing with contentious issues in their productions (for example student funding), they were well prepared to make their own judgements.

Renske Doorenspleet is a good example of an academic partner working in an already well developed ethical context (Politics and International Studies, democracy film making). I worked with Renske over three years to slowly and carefully transform a second year undergraduate module. Renske managed the transformation within the context of her department, and worked *with* students to sensitively introduce new practices – knowing just how far to go. From the outset, it was framed as a pedagogic innovation, with the students as co-researchers. However, they were allowed to decide upon their degree and type of participation as researchers (for example, attendance at focus groups was optional, and had no influence on assessment outcomes).

My strategy worked well. In effect it produced a network of researchers and research projects feeding into the development of my own ideas – and *our* ideas. My role was most often to facilitate and provide access to spaces,

technologies and advice without determining specific methods. A similar relaxed approach was taken with other users of the Media Suite (provided on an open, unrestricted, undirected basis to any member of the University). In every case, I made my dual role (or multiple roles) clear: I was there to facilitate and if individuals wanted, to develop my research ideas and cases collaboratively *with them*.

In this way I could let matters evolve in a less directive but still involved manner: observant participation.

## 1.8 Transdisciplinarity

I personally came to value the designer Tim Brown's ideas through several connections that run deeper than superficial readings of Design Thinking. And it was around these connections that a transdisciplinary project formed.

Firstly, Design Thinking contains the term "Thinking", and implies a claim that some people think differently, and that this gives them an advantage as agents of change. I am a philosopher, so to me this is an interesting claim. How different is this kind of thinking? Is it a skill that is easily acquired? Does it 'belong' to a person? Or is it only possible when certain people are combined with conditions in certain contexts? What does this tell us about minds and the world? What does it mean for agency? What does it mean for how we make the material, social, digital world? Philosophers are full of questions.

Secondly, but of no-less importance, I am a teacher, aware of the fact that

*learning is designed*, that good learning is often so because it has been more effectively designed, and finally that better designed learning is produced by better learning designers. But I am also a student, and very much aware of the extent to which students are responsible for designing their own learning as a complex and ever-evolving assemblage – a task that is at times indistinguishable from the task of designing and making a life, as a knowing, acting and feeling being-in-becoming.

My third significant role is as a programmer and designer of academic technologies, designs that we like to think enhance learning by being *designed better*. This has given me a long standing interest in design methods and design research. I immediately recognised the connections between Brown's ideas and those of more mainstream academic design researchers, including: Richard Buchanan (who used the term "design thinking" in his 1992 paper on "Wicked Problems in Design Thinking"), Donald Norman, Bryan Lawson, Nigel Cross, Ezio Manzini, Jonathan Chapman and Lucy Suchman. I also recognised the potential in excavating the roots of these connections so as to develop a more complete and more robust Design Thinking that could perhaps withstand the rigours of academic critique – the heavy weather facing any such theory applied to changing practice in higher education.

Finally, I have a more strategic perspective. I work as an academic technologist in what might be described as a supercomplex environment – although it is only through this research project that I have got to grips with what this really means. Experience has taught us that to achieve successful

designing in such an environment we must work with a broad coalition of designers (professional, guerrilla and everyday). And that includes teachers and students who adopt-adapt-create assemblages that work for them in their many diverse contexts. For me personally, well designed learning has always been of the highest priority. It follows that my mission is to enable people to design learning effectively. This was for some time in the British higher education system a less valued vocation. And now suddenly a lot of people, including very senior people, are taking an interest. Design Thinking could be an essential strategy for making the most out of the additional attention being given to teaching and learning.

This thesis is then a game of two halves and at least four disciplines: philosophy, pedagogy, design studies and innovation studies.

But this is not simply an interdisciplinary study.

In engaging with the subject matter each discipline is itself transformed by the concepts that emerge. It is therefore *transdisciplinary.*

But this is not transdisciplinarity as a fashion accessory. It is essential to the aims and interests of this research project (and I argue of higher education more broadly).

In their chapter on “The Emergence of Transdisciplinarity as a Form of Research” (from the *Handbook of Transdisciplinary Research*), Hirsch Hadorn *et al*. define diversity as an epistemic condition in which an aspect of reality,

some *thing* and its processes, may only be described and analysed (understood effectively) from multiple seemingly incompossible perspectives:

> "'Diversity' means that empirical dimensions relevant to describing and analysing processes are heterogeneous in the sense that they belong to different disciplines or to the perceptions of different actors, and that there are plural values and norms that do not fit together in a systematic way." (Hirsch Hadorn *et al*., 2008: p.26)

This is especially true of social things, where following Wittgenstein, meaning subsists within language-games, the rules of which are only meaningful within the context of the game (and the perceptions of different actors emerging out of playing the game). To know the rules, to grasp the meaning, we must play the game, experience it from the inside, and connect it to our other language-games through interaction. However, translating a complex language-game (such as lecturing mathematics) by making connections to other language-games (for example that of the learning technologist designing a new lecture theatre) may have the unforeseeable effect of transforming the game and the meaning.

In practice, this creates "complexity", defined as:

> "…the interrelations among heterogeneous dimensions, or plural values and norms. Thus complexity is in contrast to simplicity." (Pohl and Hirsch Hadorn, 2008: p.431-432)

For example, if we were to thoroughly analyse the "processes" of the lecture

theatre, the place-in-action, we would analyse it from all of the "heterogeneous" perspectives from which it is used or created. The thing-in-itself is the transversal result of these interactions between perspectives, in which there is a co-adaptive process of trying to understand each other, to predict, to connect, to exploit, to assist etc. I get to know the perspectives that are *right now* redefining the lecture theatre, only by engaging in a dialogue with those multiple perspectives. And that might introduce additional influences (the point is, it is impossible to know objectively in such a multi-perspectival co-adapting context).

To be clear, I am not claiming to be responsible for these changes. They are already well underway. What I am arguing is that these disciplines are being transformed by the emergent *designerly turn* as it spreads through people, devices, places and networks. Its effects are unavoidable. And furthermore, a discipline is in reality a ragged and evolving body. We might even say (following Deleuze and Guattari, 1972/1983), it is a Body without Organs in which certain texts stratify and control its dynamics by defining a problem space that leads to a controlled variety of solutions (a deterministic circuit). As such, the transformation is a deterritorialization away from the power exerted by those key texts. My research might then be best described as a transdisciplinary deterritorialization away from four powerful and influential authors. It is an attempt to escape their gravitational pull. The disciplines and texts most obviously transformed include:

### *1.8.1 Innovation Studies*

As defined by Everett Rogers (*Diffusion of Innovations – 5th Edition*, 2003), concerns the efficiency with which innovations are transmitted differentially through a social system, from the centre to the periphery. The problem is constructed to lead naturally to the preferred solution: better training and communication. The efficiency of the process is an objective matter subject to benchmarked evaluation – standardization.

### *1.8.2 Design Studies*

As defined by Herbert Simon (*The Sciences of the Artificial – 3rd Edition,* 2006), concerns the efficiency with which the needs of an organism (as a biological or social unit) may be met using artificially created devices. Again, the problem is constructed to lead naturally to a preferred solution: a reductivist science of design and manufacture. The efficiency of the process is an objective matter subject to benchmarked evaluation – standardization.

### *1.8.3 Higher Education Pedagogy*

As defined by John Biggs (*Teaching for Quality Learning in Higher Education – 4th Edition,* 2011), concerns the efficiency with which well-defined knowledge and skills may be transmitted to students, and their reception verified. The problem is constructed to lead to the system of design for constructive alignment. In this system, the role of the teacher is to create and manage activities and assessments, which must be aligned to well defined objectives. The efficiency of the process is an objective matter subject to benchmarked evaluation – standardization.

### *1.8.4 Philosophy*

As defined by Immanuel Kant (*The Conflict of the Faculties,* 1798/1992), philosophy concerns the control or limitation of human reasoning through *critique* – the exposure of transgressions against reasonable behaviour (scientific, moral or aesthetic, as defined in the three critiques). In Kant's case, the problem is constructed so as to lead to a design for society and, more importantly, a design of the University, with philosophy at its heart, autonomous and freely deploying its critical powers according to the laws of reasoning. In Kant's system, the term "philosophy" refers to academics from the "pure" disciplines, including logic, mathematics and the natural sciences. The efficiency of the University is then critically evaluated by philosophers for its ability to preserve their autonomy and the purity of their reasoning in the face of external pressures.

The University, according to Kant, should be constructed as a set of distinct faculties, organised into two levels: lower (of which there is one faculty) and higher (constituted from three). These terms have the potential to confuse the reader. They are not hierarchical in the modern sense, they are arranged in relation to their moral duties – with theology at the top. The higher faculties are higher because of their visibility and accountability to the outside world, especially the government. Kant writes that:

> "…a faculty is considered higher only if its teachings – both as to their content and the way they are expounded to the public – interest the government itself, while the faculty whose function is only to look after

> the interests of science is called lower because it may use its own judgement about what it teaches." (Kant, 1798/1992: p.25-27)

The immunity is specified as a law governing the relations between the faculties and their levels, and through the higher faculties, between the University, the government and the public. We can see how Kant intends this as a means of insulating the more authentic work of *disinterested reason*:

> "Now the government is interested primarily in means for securing the strongest and most lasting influence on the people, and the subjects which the higher faculties teach are just such means. Accordingly, the government reserves the right itself to *sanction* the teachings of the higher faculties, but those of the lower faculty it leaves up to the scholars' reason." (Kant, 1798/1992: p.27)

The three higher faculties are themselves ordered in a hierarchy "in accordance with reason…*theology* first, *law* second, and *medicine* third" (*ibid*. p.33). The role of scholars within these faculties is simply to transmit authorised knowledge as specified in state-accredited text books:

> "It is self-evident that such a text (or book) must comprise *statutes*, that is, teachings that proceed from an act of choice on the part of an authority (that do not issue directly from reason); for otherwise it could not demand obedience simply, as something the government has sanctioned." (*ibid.* p.33)

The censor is allowed into the higher faculties, because the content of those faculties teachings is derived from the government, and the censor represents the government. The model underpinning this relationship with the censor is that of a certain kind of *legal studies*, where there is a tendency to stray from the legislation and rulings of the state, a creativity that must be kept in check. The more turbulent domain of theology was to follow this model in relation to state-bounded readings of authorised versions of the *Bible*. Medicine, at the time much less well developed and still based very much on classical texts by the likes of Galen *or* on folk knowledge, was deeply engaged in its own battles for legitimisation and regulation. In Kant we see the development of the University as a state apparatus for controlling the legitimacy of judgement:

> "But even when the government sanctions teachings, it does not itself *teach*; it requires only that the respective faculties, *in expounding a subject publicly*, adopt certain teachings and exclude their contraries." (*ibid.* p.27)

The counterpart of this, its essential balance against a descent into tyranny and madness (which Kant knew all too well from the times in which he lived), is the lower faculty, immunised by law and convention from the government, which constitutionally *must* maintain its natural enemy *even in times of conflict,* as a condition for its own possibility:

> "It is absolutely essential that the learned community of the University also contain a faculty that is independent of the government's command with regard to its teachings; one that, having no commands

> to give, is free to evaluate everything, and concerns itself with the interests of the sciences, that is, with truth: one in which reason is authorized to speak out publicly." (*ibid*. p.27-29)

The University and this enlightenment concept of reason are in this way produced as a kind of *constitutional settlement* between the public, the government and the academy.

Kant did not intend his "philosophy" faculty to be of the type that we would today call the "humanities". In 1798 science and philosophy had yet to separate in the way that we know today. There was not such a clear distinction between the experimental method of material science and what today we might call the *phenomenological* method of Kant's *critiques* – especially the *Critique of Pure Reason* (1787) which also has aspects of what we recognise as psychology. The philosophy faculty in Kant's design includes *natural philosophy* – the nascent empirical sciences – as well as *history* (as a critical investigative discipline, not as the transmission of received wisdom ), and we can assume also *aesthetics* mixed with *art history* (the *Critique of Judgement* draws upon insights from observations on art and culture from around the world, including a remarkable discussion of Maori tattoos). Kant further divided the philosophy faculty into two "departments":

> "…a department of *historical knowledge* (including history, geography, philology, and the humanities, along with all the empirical knowledge contained in the natural sciences), and a department of *pure rational knowledge* (pure mathematics and pure philosophy, the metaphysics

of nature and of morals).” (Kant, 1798/1992: p.45)

Kant’s philosophy faculty is not so much defined by its subject matter, as by the freedom with which reason chooses its own subject matter and determines its own methods – not as a response to the market or the government, but as a product of its own *transcendental* reasoning.

There is a chance that in redesigning the University we are in fact reproducing Kant’s design – with new forms of protective mechanisms in the higher faculty, covering the same unchanging inner core hidden in the **bunker** of the lower faculty. This **bunker mentality** must be challenged.

# 1.9 Why is this a matter of urgency?

### *1.9.1 The post-Browne building boom*

At an open session on July 8th 2014 an exciting proposal was made to the wider University community at Warwick:

> "The new Teaching and Learning Building will increase dedicated teaching and learning space to provide an inclusive educational environment accessible to all."[29]

Professor Lawrence Young (Pro-vice Chancellor for Academic Planning and Resources) addressed a gathering of staff.

> "The building represents our commitment to teaching and enhancing the student experience through providing a 500-seater premier lecture theatre and a variety of flexible and functional teaching rooms alongside social learning spaces."

The project represents a significant and perhaps radical departure from Warwick's design history. In the past teaching and learning spaces had been placed unobtrusively, modestly, amongst academic buildings. The Ramphal Building (1996) presented impressive spaces from the inside, with its atrium wall covered by Simon Patterson's vast Deep Purple inspired artwork *Cosmic Wallpaper*[30]. And it does mostly serve as a teaching and learning space. However, the 2012 refurbishment, designed by the Institute for Advanced

[29] From the internally distributed notes from the presentation.

[30] http://www2.warwick.ac.uk/services/art/artist/simonpatterson/wu0791/

Teaching and Learning (IATL) and the Berman Guedes Stretton architecture firm, illustrated the gap between the original design and the real needs of students and teachers. Poorly-lit rooms with rows of immovable desks were replaced by spaces that are bright, open, reconfigurable and welcoming.

The new building will be something quite different altogether. It will have "an outstanding architectural form" as "an integral part of university life and landscape" – the link is made between the classroom, the social space and the learning landscape. And it will be "adaptable to different uses, with an inspiring and welcoming environment" from the outset. And finally, the brief lays down a historical marker:

> "The building shall become the exemplar for the built form at the University of Warwick for the next 50 years."

In his address to the meeting, Professor Young stated that the building should "make students know that we care about them." That could be interpreted as a mere marketing ploy, especially given the significance of the placement of the building in the landscape, its positioning along the path followed by prospective students and their parents on open days, from the University headquarters (University House) towards the new building at the opposite corner of University Road, beckoning them into the future.

It might be argued, in the wider context of changes to university funding in England and Wales following the proposals of Lord Browne's committee on university finance and student funding, that these design responses are short-

term, ill-considered, band-waggoning. The facts are hard to ignore.
When we consider the design history of Warwick University, as a series of responses to shifting governments (and the ensuing chaotic dynamics), this might seem to be more of the same.

Or alternatively we might see Browne as just being one input, one of many triggers, feeding into and accelerating changes in the ways in which design and designerliness works in higher education – for example connecting to, but not necessarily aligning with Learning Landscapes and The Student as Producer. And perhaps also with the development of Design Thinking? These developments, late-on in the life-span of my project, added a further layer of disruption and complexity. What could be made of them?

Higher education is right now poised before a fork in the road, in response to Lord Browne's report and the subsequent new order, as well as wider developments in society. It could go either way. Browne has had a significant impact on setting the design agenda for universities. This is set against an already active alternative designerly dialogue (at Warwick, the Reinvention Centre, the CAPITAL Centre and the Institute for Advanced Teaching and Learning have stimulated this). And against disruptive influences from the worlds of technology and capitalism (especially the MOOC). I argue that the Teaching and Learning Building brief is not superficial spin. But it does need to be seen in the context of the design history of Warwick and of British higher education – a design history full of contentions and architectural fashions following political trends. And furthermore, success is not guaranteed by the commitment to spend big money and for senior leaders to say the right things.

The appointment of an architect (Daniel Gibbons) as a Senior Project Manager in the Estates service, is one sign of a more substantial change. Architects from Berman Guedes Stretton (BGS), award winners in the fields of education and culture, are on campus almost continually. When I interviewed Neil Eaton and Hamish McMichael from BGS (17th June 2014) and Daniel Gibbons from Estates (19th June 2014) their *designerliness,* their *design thinking* was very much recognisable. By coincidence, my interview with Neil and Hamish was conducted along with Dean McIllwraith, the manager of Warwick's Learning Grid (a technology equipped social learning space for students). Dean is an expert in the use of space and technology by students for independent and collaborative study. In his role in the Learning Grid, he has been an observant participant in these activities for over ten years. During the course of the interview, Neil, Hamish and Dean spoke the same kind of *designerly* language, drawing upon related experiences and knowledge. Dean has attained that knowledge at first hand, helping students on a day-to-day basis. Neil and Hamish have used their *designerly sensibilities* and skills to develop a detailed understanding of higher education teaching and learning – not just as zoomed into to the detail of specific events now, but in the longer context of its development over time. As this extract from the interview transcript illustrates:

> Hamish McMichael (BGS): "Architecture is an interesting discipline in that it deals with everything from the urban scale right down to furniture and fixtures, so we have to have an eye on both sides of the scale. We're creating an envelope of a building in the middle, but quite

> often we don't get involved in what happens in the space. We quite often, as a profession, hand over a building, quite often have a limited engagement with that building afterwards…but often we have to design a building that is flexible up to a point and make a lot of assumptions about how it's going to be used and then walk away and hand over, because that's the way the industry is set up. But what is actually very interesting is a building that is continually evolving and adapting, and it seems that is a lot of what you are trying to achieve [at Warwick] with the Learning Grid."

Hamish connected this with the BGS refresh of the Ramphal Building's teaching spaces:

> "Our brief was to refresh it, to try and adapt what was there to meet emerging modes and methods of teaching, and to try and squeeze a little bit more from the building, so for example the touch-down and break-out spaces on the balcony, which were added and created."

But he does not just see that as an isolated project, he fits it into a bigger picture:

> "Buildings will have that cyclical lifespan, they will be built and handed-over, but buildings will quite often have that kind of cyclical lifespan. They might be designed, built and handed-over, and they might last 10-15 years before requiring a refurbishment to suit how buildings have moved on, whether that's technologies, or culture, or ways of

> teaching have evolved and developed, the building needs to be refreshed to catch up."

Architecture then has a history. University architecture is following its own trajectory of development. And this influences how the architects approach their work. A kind of investigative, theory-building and testing, *designerly reflexivity* is at work.

> Neil Eaton: "I think there has been a definite move in the way that the architecture is put together, in that I think that 15 or maybe 30 years ago we had a lot of deterministic buildings that were built in a very hard way to a particular brief, often a cellular brief, which then turn out to be very difficult to bring up to date, and I think there has been a pretty clear move away from that kind of space in the intervening years, and a recognition that if you have the type, which is to do with building economics as well but is definitely to do with the wilful architectural design of them, that I think you now take it as read that you are designing something that is very much open source, that it is very much a frame and fit-out kind of architecture, and you are anticipating that this space, the functional space, might be much more readily reconfigurable."

The conversation epitomised the kind of *designerly* conversation that has, in the past, seemed rare at Warwick. Dean McIllwraith (manager of the Learning Grid) is one of the few people who readily sees things from this perspective. The discussion with Hamish and Neil became even more interesting as we

discussed specific examples from Warwick and beyond. Dean has plenty of stories that flesh-out these ideas with real-life examples. For example, he talked about how at specific times in the University year, students reconfigure the Learning Grid spaces in different ways – using partition boards and movable white boards to create private spaces. Hamish and Neil related this to innovations in furniture and architecture that support this kind of "open source" re-configurability.

A third interview, conducted around the same time, illustrates how this new designerliness has not yet become a default way of thinking and acting across the whole university. At the time (23rd June 2014) Erin Davies was the Education Officer of Warwick's Students' Union (her term ended in September 2015). Before that she had been a Law and Sociology student. This gives her a kind of detailed *design knowledge* concerning the ways in which teaching and learning may be arranged at Warwick, the ways in in which spaces, events, tools, resources may be combined and used by students and teachers – and consequently, she has first-hand experience of the divide between contexts in which participants innovate to make the most from the available features, and those that do not.

At the time of our interview, Erin was part of the wider dialogue concerning the proposed Teaching and Learning building, and had been helping with focus groups for Hamish, Neil and Daniel. Unprompted, Erin described her own Learning Grid self-organised learning design:

> "On the top floor of the Learning Grid there's one corner where it is a room in the window, we would build up with a couple of movable white boards a space, we would have maybe twenty of us in there. The window-sill would have tea cups, instant hot chocolate, instant noodles and stuff like that."

But that was for Sociology – a sociable group of students. In Law, things were very different: a competitive and self-interested culture, less likely to appreciate the value of dialogue. She then went on to describe the remarkable lengths that some Law teachers at Warwick go in order to counteract this tendency. In 2011 I observed this at first hand. At the time, Professor Paul Raffield[31] of the Law School was co-teaching a module called "Shakespeare and the Law" with Professor Carol Rutter[32] of the English Department and the CAPITAL Centre[33]. The module combined Law students with English students in a collaborative exploration of legal concepts in Shakespeare's plays. This is a rich seem to mine, as much for the Law students as it is for the English students. Based upon the view of Law students as competitive and self-interested, the fact that Law students on the module outnumbered the English students might seem to be a surprise. I sat-in on three end-of-module performances, in which Shakespeare was staged to highlight its relationship with the law. They were impressive performances, in which all of the students were equally engaged and exposed to the risks associated with being on the stage.

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[31] Professor Raffield is a Higher Education Academy National Teaching Fellow.
[32] Professor Rutter is also a HEA NTF.
[33] The Creativity and Performance in Teaching and Learning Centre for Excellence in Teaching and Learning.

Even more surprisingly, the teaching methods employed in the Shakespeare and the Law were of the kind described by Rutter as Open-space Learning (OSL).[34] This is a workshop-based approach, often taught "without chairs" in theatre-style spaces. For many students it can prove to be too challenging – going against expectations and against physical and emotional comfort. I have myself participated in Open-space Learning workshops with Carol Rutter, and can understand why some people find it hard – the ethic is that of the theatre, with the expectation that artistic and intellectual breakthroughs are made by ensembles pushing beyond their boundaries.

Also in 2011, I observed and interviewed a range of English Department students undertaking their core Shakespeare module. At the time the module was taught in three different modes, with each student choosing a mode to follow at the start of the year. The modules were: conventional (lecture and conventional seminar with chairs and tables), "without chairs" (lectures combined with the full-on Rutter-style Open-space Learning) and an intermediate mixed mode. I had assumed that English Department students would be entirely comfortable with the OSL method, and perhaps some chose the intermediate or conventional approaches for practical reasons (OSL takes more time and energy). When I interviewed a selection of ten of the students, my prejudices were quickly overturned. The "without chairs" students were able to describe the design details, and their implications, in much more detail, and with greater enthusiasm. Their seemed to be a gap between the groups in the quantity and quality of reflection applied to considerations of the

[34] The Open-space Learning approach was developed by CAPITAL and documented in Monks et al. 2012.

learning environment, the tools, techniques and their implications. This might have been there from the outset, resulting in such students signing-up for the module, or it might have developed as a result of participating in the OSL activities, or perhaps it was there to some extent to begin with and developed through the activities. My small post-event sample could not confirm which was the case. My discussions with the Shakespeare and the Law students suggested a likely process. Both Paul Raffield and Carol Rutter are brilliant articulators of their methods and their rationales. In the case of both modules, prospective students were exposed to these “sales pitches”. Some students “got it” right away, and connected with the design details and were able to imagine the possibilities. Others either did not, or were more negatively disturbed by the idea of working in a radically different way.

We can see then that the situation is more complicated. Not all Law students are averse to pedagogic design innovation of the collaborative OSL-style. And not all Arts students are ready to dive-in to the theatrical cauldron. Some teachers are able undertake effective pedagogic design innovations and articulate their benefits to students. Others are not. And there is no simple disciplinary difference in capability.

This pattern has been further illustrated during 2013-2014 in response to radical changes to the undergraduate History curriculum. We introduced media production (video, audio, web) as a compulsory activity in the core Making History module. Student responses to this were mixed – a minority of students understood the potential of new media in history right away, and responded imaginatively, another minority reacted with outrage at the

digression from the lecture, book-study, seminar and written exam formula. The majority of students viewed it as an interesting but not essential diversion – although this appreciation might change over time. This highlights the importance of making sense of design change for all of those involved. And that requires some additional design thinking, considering how new kinds of tasks are framed. David Beck (History tutor and Digital Humanities specialist) reflected upon the outcomes of the innovation, saying that the students tended to create videos that were in reality “essays read-out with images”. The task had been framed as “work equivalent to a 2000 word essay”. Where students had taken a more performative, theatrical approach (for example one student created a video in the style of a war historian) the results were more interesting. By reflecting upon this, David and the Making History team have adopted and adapted the concept of “digital storytelling”, which includes clearer ideas on what makes this kind of production distinctive and how it might be assessed within the parameters of the existing academic system (and slightly pushing its limits) – in the future the task will be framed in these terms.

And the concept has begun to spread to other departments - Michael Scott and Clare Rowan of Classics are experimenting with digital storytelling approaches (and finding external resources to help with developing skills and practices). With this additional element of design thinking (facilitated by David Beck) academic and student practice is beginning to evolve in a more consistent, collaborative and thoughtful way. The lesson to draw from this regarding the question “why is this a matter of urgency?” should be clear – design thinking can accelerate and improve the co-adaption of teachers,

students, pedagogy and support infrastructure. But there are no guarantees, only with luck someone like David Beck is there to help. As will be seen, design ideas (or patterns) like *digital storytelling* are rarely emerging at Warwick University, and hence not being developed in a *designerly* way to work within existing academic contexts. Which means that vital questions like "how much student time does this assessment type require?" are not often being researched clearly.

A more alarming picture was uncovered in a series of interviews that I conducted with PhD students in the Research Exchange[35] in February 2012. Of the sixteen students interviewed[36], I found very little use of new technologies or methods that would not have been in use a decade earlier. Microsoft Word was in some cases being used with some imagination, but with no real consideration of its limitations and alternatives. When asked about how they acquired their study and writing techniques, the majority could not give an account that illustrated much deep consideration – the process seemed *ad hoc*, except for in four interesting cases:

- two science students who told me that they had adopted the same approaches as used in the research teams in which they were based;
- two humanities students, who had identified severe challenges to their techniques in the face of complex research subjects, and had then sought and adopted new technologies to deal with the challenges (in

[35] A recently developed space with the Library at the University of Warwick, dedicated to PhD students and early career researchers, and created with collaborative study practices in mind.
[36] 3 social scientists, 2 conventional science subjects, 1 mixed social science and medicine, 10 from various humanities subjects. An even mix of male and female.

> one case Evernote online notebooks and in the other case Mindmanager concept mapping).

Elsewhere, I have found some PhD students who have grasped the potential of the many new technologies, spaces and methods that have become available in recent years. For example, Christian Smith in the English Department (now a post-doctoral teaching fellow) has adopted-adapted web technologies, film-making and the Moodle virtual learning environment to fit well with his own research and teaching practices. In November 2013, Christian joined with me and a small group of teachers from across the University to discuss a design idea called “flipping the classroom”. We summarised the basic design proposition behind this as follows:

> The Flipped Classroom idea is simple: the students consume lecture content as videos or audios individually in their own time, freeing-up lecture time for more interactive and constructive pedagogies, with the students being more engaged and active in class. This assumes that classroom time, or in the HE context lecture time, is normally used for the transmission of content from the teacher to the students, and that a state of student inactivity can be replaced by additional opportunities for student activity. The starting point of the argument is that classrooms are insufficiently interactive and constructive, being overburdened by the need to cover lots of facts and examples. It is assumed that homework is the student’s main opportunity for interacting more constructively with the material, and that this happens mostly in isolation, with little socially interactive learning. The Flipped

> Classroom originates in the US High School context, where this might be the case, and where the challenge is to get students more engaged and more active in their own learning  or as is often the case, to keep them in schools, productively occupied, unarmed and off the streets.[37]

It is an idea with great potential to transform the learning experience. In the workshop, we asked the *designerly* question:

> Does this fit with the Higher Education context? Specifically anywhere in Warwick? Considering the existing nature of H.E. teaching and learning, are there still times and places where the Flipped Classroom model has significant **fit**? Do we still need to make more time for active learning? Or is the lecture always an ineliminable social learning event?

Christian teaches on a first year undergraduate module called "Modern World Literature". It is a challenging *and* transformative experience for the students. Working with Christian, I turned this into a "design study" that documents the design challenge and the solution. This indicated a high degree of "designerliness" in Christian's response to the challenges arising in this especially difficult module. He begins with a description of the challenge – from the student's perspective as well as the teacher's. For example:

> For each week of the module, the students read and try to make sense of a major text, ranging from Faust to contemporary fiction. And at the

[37] A summary of the workshop, with five small design studies, is available as a working paper at http://wrap.warwick.ac.uk/58050/

> same time, they need to be getting to grips with the concept of "modernity". However, modernity is not a fact, or a simple term defined in a dictionary. It is highly contested and complex, as is often the case with humanities concepts. There are many ways into it, many ways out to other concepts and the non-conceptual, and new possibilities to be invented along the way. The module includes contributions from a range of academics from the English Department, using approaches grounded in a variety of disciplines (including economics, politics, psychoanalysis, history and philosophy).

Out of this, and an engagement with new technologies and new techniques, the design for the Modernity Clinic emerged:

> In the clinic the students are presented with a range of texts, images and videos, each of which can provoke a response from the student in which their understanding of modernity is developed and applied. The texts include key texts from theorists of modernity with conflicting views and approaches. The images are an eclectic selection, carefully chosen. The students are encouraged to post new images, suggesting how other students might respond to them, and initiating further critical discussions. Video is used in a more creative way than might be the case in conventional Flipped Classroom. Short videos have been created with Warwick academics talking about their views on modernity and the texts. This encapsulates in a single place contrasting views and styles, for example from Stephen Shapiro and Thomas Docherty. Finally, a further technique makes this

> interpretation of the Flipped Classroom especially effective. Although the seminars are still linked to the long series of big texts, the Modernity Clinic is sometimes displayed on the screen in the seminars (along with the Evernote notebooks in Christian's workshop sessions), meaning that the materials within it and the responses from the students can be used to enrich the seminars and to connect them with the students' developing concept of modernity.

Work like this is still relatively rare. The spread of the approach, or at least the adaption of some of its ideas and techniques, has been slow, even amongst other teachers on the same module. As I discovered when I interviewed Christian about his background, he came to academia late, having had a successful career in the health and fitness industry. This gave him experience of designing and adapting a commercial service to a wide range of clients, based upon a deep understanding of their needs. He also has a sophisticated understanding of creative techniques. His wife is a composer and musician, and he is able to talk with great insight about how her creativity works.

These indications might then lead us to consider Christian as being a special case. As I discovered, there are many similar special cases. And we can occasionally see that in how people innovate. For example, in an interview undertaken in 2012, William Rupp (PhD History, now working in the University administration) described how he adapted wiki software into a research database for his PhD about an 18$^{th}$ Century travel writer. William is now working in the field of "widening participation" – responsible for creating events and activities for school children to get them interested in the idea of

being a university student. And that is another set of supercomplex challenges requiring innovative and *designerly* responses. I have since had many designerly conversations with both Christian and William as they incrementally improve the systems that they are using, and transfer them to other applications. But at the same time I am aware of the many people who are not working in this way.

### *1.9.2 The design divide*

Attitudes, and an underlying ability to think about design differences and their usefulness, are therefore mixed and distributed following patterns that might seem chaotic. We might even say that **there is an uneven distribution of designerliness** – a predilection for being concerned with and making the most of design details and design innovations. The resultant landscape of learning and teaching designs is, it seems, chaotic as a result. The resultant outcomes are more clear. Some people are able to grasp the potential of new technologies, practices and opportunities, and exploit them for remarkable results. Others do not seem to be so fortuitous.

I am not the first person to identify this problem, although more often it is seen from the perspective of a *digital divide*. Sue Watling, for example, repurposes the term for an age in which (at least in the developed world) access to digital technologies has become more evenly distributed. It is "…less about unequal access to computers and more about unequal ways in which they are used…" (Watling, 2009: p.83). This can appear as a divide between educational institutions (in which the adaptation of new technologies into pedagogy lags behind the rate of innovation) and students – the so called "Prensky digital natives and digital immigrants theory" (Prensky, 2001) would predict that adoption of new technologies amongst academic staff (digital immigrants) should be a constraining force. However, more recent research into student uses and expectations of learning technologies indicates a more complex picture. David White and Joanna Wild investigated the "incoming expectations of the digital environment formed at school" (White and Wild, 2014) as part of the JISC Digital Student project. This went some way to overturning the

assumption that students are entering the University from schools with well developed capabilities and expectations for the use of learning technologies. In fact it seems that at school they are often only exposed to limited use of technology for learning. Outside of the school experience, student use of technologies is not necessarily especially sophisticated (Facebook is still dominant, but there are now signs of it being surpassed by even more simple social networking platforms like Instagram). There are no guarantees that new undergraduates arrive with an understanding of the potential of new technologies, the skills required to make the most of them, or a designerly way of assembling their own selections and combinations of technologies. White and Wild state that:

> "…access to the Web at home means that students are developing 'independent' learning methods, or perhaps habits, earlier in their educational careers than in a pre-Web era but often without formal pedagogical or critical support." (White and Wild, 2014: p.9)

In relation to these more free-form uses of technology at home, the constrained use of technology in school (often limited by concerns over security, behaviour and access to dangerous content) creates un-necessarily constrained expectations concerning how technologies should be used. (*ibid.* p.10). With expectations being so low, experience of variations in design and opportunities to redesign are limited – there is less exposure to what I later term *the imperative to design* (chapter 2.1.3). A digital divide then becomes a design divide – which might then only act to exacerbate the digital divide.

These dynamics are not, of course, always deterministic. In some cases some people have different experiences. Some students come to University with an already well developed digital and designerly capability. This might come from variations in the education system, with some lucky students exposed to a better experience. As a precursor to my PhD research project, I set up a team of undergraduate students called the Arts Faculty E-Squad. This was complemented by an open access media production facility (called the Arts Media Suite). The E-Squad were then trained and deployed to assist academics in the Arts Faculty with digital enhancement projects. Some of the students in the Arts E-Squad, and some of the students who used the Media Suite, obviously came to undergraduate studies with such capabilities well developed. Some of them were *designerly* to a very high level, including an awareness of and conscious direction of their own designerly capabilities. Some of the students have since gone on to great successes in design and creative industries.

However, this is not the case for many students at Warwick. And perhaps even less so for academic staff. There is then the possibility of a design divide constraining the success of individuals, the University and our wider society. As the pace of technological and cultural development accelerates, this might even become a widening design divide, with some people able to exploit and create new possibilities, whilst others fall behind.

### *1.9.3 The future workplace is now*

In August 2014 I spent a half a day with the Theatre Studies and E-Squad graduate Catherine Allen at her office in London, joining in with creative discussions and observing how her company works. Catherine played a key role in the Arts Faculty E-Squad at Warwick, and after a year had already set up her own production company working through the E-Squad's creative network. In July 2014 (at Warwick), in a discussion following my presentation on lessons learned from the E-Squad with implications for "widening participation in higher education", she stated that the most important thing that she learned from her experience was the ability to *develop a brief carefully and interactively with a client, which might involve developing the client's understanding along the way.* After graduating, Catherine started a further two successful media production companies, before joining the award winning app production company Touch Press (Apple education app of the year 2013, Children's BAFTA 2014).

When I visited Touch Press I discovered an almost text-book perfect implementation of well known creative industries methods in a closely-knit multi-disciplinary team (with 30 people) – a way of working that is becoming increasingly common in all kinds of industry (and which is essential to the IDEO approach to Design Thinking outside of the creative industries described in Chapter 2.5.4).

I was fortunate to get some time with the *Chief Technology Officer* John Cromie (a co-founder of Touch Press). John described with a high-degree of reflective awareness, the careful balance between management and

creativity, systematic structure and freeform experimentation, that makes such enterprises so successful:

> John Cromie (JC): "We need people who have confident thinking and creative skills, not just people who obey orders. There's a lot of skills they need to assimilate across a wide range of activities, in everything from being able to write well, to be able to understand visual communications, to be able to understand how software works, to be able to tell a story, all the skills that come together in building an app. An interesting example is an app we are working on with an interactive graphic novel. There's storytelling, interactive design, software design and hanging it all together. But ultimately it still has to be a really good graphic novel. Each person with those skills can do a fantastic job, but you can still end up with a mediocre product."
>
> Robert O'Toole (RO): "So there's always a sense in there of the core design values. How do you get that?"
>
> JC: "It's tough. We look to Pixar here, as a sort of role model for how to work. Ed Catmull's book *Creativity Inc.*[38] They have a very similar kind of philosophy. One of the things that is really important is what they call their Braintrust, which is this cross-disciplinary group that come in at particular points and review projects, and take a step back and look at something like, for example the graphic novel, and identify where it just doesn't work, and where the team who are working on it

[38] *Creativity Inc. – Overcoming the Unseen Forces that Stand in the Way of True Inspiration.* Catmull, 2014.

have become so immersed in it, so they are so engaged in it and committed to it that they can't assess it properly."

Catherine Allen (CA): "It's like a team of internal consultants."

JC: "An internal review. That group has its authority, not because the people are necessarily more senior, some of them may actually be more junior, but because as a group they have this role for making sure that anything that Pixar puts out the door is to the highest possible standard."

RO: "That's just built in as an assumption, shared by everyone?"

JC: "It's the difference between a company that puts out some very good products, and a company that only puts out exceptional products."

Touch Press is known to the outside world for its exceptional products. Pixar is known in the business world as a company that puts out exceptional products because of its highly reflexive (self appreciating, self critical) creative approach. Hearing John Cromie describe how Touch Press uses the Pixar approach reminded me of reading Ed Catmull's *Harvard Business Review* paper from September 2008 on "How Pixar Manages Creativity". I came across this in 2009, and was immediately struck by the similarities between the emergent E-Squad approach (being developed by the students themselves) and the ways of thinking and acting used by Pixar – especially

the co-presence and careful reflexive management of personal engagement (going deep into the project) and a critical stance (standing back from the project). This guards against the formation of *echo chambers* (a term used by Catherine) in which a version of the truth is continually reinforced by a network of opinion-formers, each looking for confidence and certainty. Now, seeing Catherine working in the Touch Press way, and hearing it described in these terms by John Cromie, I could see the connections more clearly. And Catherine confirmed the value of the E-Squad experience. I could then see the richness and relevance of the self-organised learning process created by the students at Warwick. But this is not an isolated example. As I discovered when I interviewed and observed students and teachers within the Warwick Writing Programme and in Theatre Studies, these sensibilities are well developed and explicitly encouraged.

However, these characteristics, these *designerly capabilities* are not as widely distributed as we might hope. It might still be the case that very few students at universities like Warwick get to develop the abilities that will help them to thrive in the workplace of the future – or the world class workplace of today.

### *1.9.4 Students need sofas*

Turning back to the implications of the new Teaching and Learning building, we can appreciate the implications of this chaotically arranged "design divide" – are we all equally ready to make the most of the opportunities? Are we all equally responding to them with the benefits of the present and future university community in mind? Is there a well-developed design dialogue in place able to shape developments?

This research reports upon many cases that contribute to an understanding of and possibly an answer to these questions. There is both negative and positive news.

Very briefly I will now detail a little bit of highly valuable design knowledge and design thinking that has recently emerged. It illustrates both the value of small design details and, more importantly, the value of designerly dialogues that reveal to us the everyday details that make a big difference in the lives of individuals to the success of the University.

This case illustrates in a small way the big potential of design thinking in the University.

The designerly conversation being stimulated by the proposed Teaching and Learning building, facilitated by the architects (Berman Guedes Stretton), has achieved at least one significant step forwards. We now know that *students need sofas.* This issue was raised by Erin Davies during our interview. It seems so obvious, how could we have possibly have overlooked it?


*Students' Union sofa space, sponsored by IKEA.*

The sofa is such a fundamental part of modern life, and yet students living on campus have only limited access to "sofa time". In the past, the social spaces in student halls of residence have mostly been kitchens. And from an institutional-corporate perspective, the most important requirement of kitchens is that they are easy to clean. Space is also limited. A dining table capable of accommodating all of the students from a floor or block is the top priority. And that leaves no room for sofas. But sofas do pop-up around campus. And wherever they appear they are populated by students, sitting, reading, talking on the phone, tapping away at computers or (more commonly now) swiping away at iPads.

Once the issue of sofas is raised, it is hard to ignore. In my own experience as a student at Warwick, I can recall their seminal importance to my academic development: especially the informal Philosophy Department reading groups

with Nick Land in the Students' Union. And I can lament the loss of sofa space on campus. Erin Davies has similar memories. Together we reminisced, and discussed the merits of specific sofa spaces – why some work better than others, and how they really do not need to have giant television screens placed immediately in front of them, with the news playing 24/7 and disrupting conversations and private thoughts.

And then there is the relationship between sofas and benches, their open-air siblings. Or how about bean bags? In the summer of 2014 I observed postgraduate students making an *ad hoc* bean bag based study space on the lawn outside of Senate House. They were being loaned-out by the Postgraduate Hub.[39] I might have even talked philosophically about sofas and neo-Baroque design: how the human body and its psychogeographic trajectory folds itself into the sofa, and how a whole world of subjective experience is folded into that inflection of the environment.

*Bean bag study space, University of Warwick, summer 2014.*

In design, small things have big implications. The existence of a digital divide might mean that small things, like sofas, remain unappreciated and

[39] A Learning Grid style study space reserved for postgraduate students.

subsequently ignored by the people and processes through which the learning landscape is produced. Or worse than that, good sofa space might be ruined by the inappropriate placement of television screens – some might disagree, but the important thing is for these details to be taken up as matters of concern within a broader and more sophisticated design dialogue.

# 2. Seeing the University through the lens of design

The task then is to describe the framework of concepts that I call the *designerly world-view* – the development of which has been a significant part of this research project. This is not an exposition of an already cohesive and operational discipline or profession. Rather, it is a transdisciplinary synthesis of concepts and practices constructed from experience (of many people, including my own), theory and research. It is also not a complete and cohesive system. I agree with Richard Buchanan in emphasising the inherently provisional and historically contingent nature of design theory, and not being *too* worried by that (see especially Buchanan's 2001 paper on "Design Research and the New Learning").

I have taken the term "designerly" (unfamiliar to many, including the makers of dictionaries) from the title of a book by the design researcher Nigel Cross, on *Designerly Ways of Knowing* (2007). However, my conceptual work leads to a broader understanding of designerliness – more than just an epistemic system or tendency belonging to professional designers. Designerliness may also be a property of cultures, organisational forms, language, devices (which more or less facilitate designing) and what I call *everyday designers*. Indeed designerliness is a property of designed things, designs that facilitate design and grow design capability, in a kind of self-developing circularity. A circularity that includes both searching for and making possible a world that approximates more closely to our (design) values. A kind of virtuous circle, fed by and leading to enhanced *design capabilities*. And that is perhaps the

most important concept or “image of thought” (Deleuze and Guattari, 1991/1994) developed here.

I start with the word “design” as in “a design”. I begin with a breakdown of the complexity of designs through a set of abstractions, including *assemblage* and *platform* (in 2.1.2). The assemblage approach goes well beyond a straightforwardly functional interpretation. It leaves open the possibility of designs being composed of many different types of “event” (equivalent to *things* in my event ontology). Interactions, experience architectures, choice architectures, emotional designs…some of the key elements in human-centric designs are discussed. Chapter 2.1 ends with an exploration of the diversity and supercomplexity of designs in the University, as viewed through the assemblage approach.

However, this tends towards a conception of the design that is too static. Real designs are shown to be intimately tied to human agency and reflexivity, and this introduces a more dynamic and disruptive element – leading into the exploration of “designing” as a [trans]human activity in search of *fit, stick, spread and grow* (Chapter 2.2). Different forms and arrangements of “designers, designerliness and design capability” (Chapter 2.3) are explored – craftspeople, professional designers, guerrilla designers and (increasingly) everyday designers. Examples of designing and designers at Warwick (of all types) are used to illustrate the arrangement of design capability in operation (which is not a well-integrated managed system).

Designs are becoming more like dynamic, self-modifying systems, leading to

a more supercomplex world in which designing is an everyday activity. The resulting diversity of designs is a major challenge in itself. The supercomplex consequences of this for the University are explored (Chapter 2.4). Finally, a set of strategies are described for addressing these challenges, combining better design knowledge, value-led designing and better organised design capability (Chapter 2.5). Design Thinking is shown to be an approach to achieving these goals, and I end with the consideration of the prospects for Design Thinking in the supercomplex University.

## 2.1 Design

> "Design is a word that's come to mean so much that it's also a word that has come to mean nothing. We don't really talk about design, we talk about developing ideas and making products" (Sir Jonathan Ive interviewed by Shane Richmond for the Daily Telegraph, June 2012)[40]

In any discussion concerning “design” the ubiquity and consequent imprecision of the term threatens to get in the way. The word pops-up frequently in my day-to-day dealings as an itinerant academic technologist working amongst all kinds of university people. It is principally used as a verb – *to design*. But if I ask of people what they mean, it becomes clear that the usage is vague, and almost synonymous with *to make*. The one additional feature differentiating *to design* from *to make*, in this way of speaking, is a sense that *to design* indicates some additional conscious deliberation. Not necessarily a process, but at least an additional effort in the activity or an uncertainty in the outcome. The implications seems to be that ordinary everyday making might be hard, but designing is something special, motivated by more challenging circumstances *or* a slightly higher ambition. The difference is between: “I’m going to deliver a lecture” and “I’m designing a lecture”. Beyond that, it gets harder to glean what people *really* mean by *to design* from their ordinary discourse – even when the term is used in conversations with potentially irreversible and widespread consequence (committee meetings are full of this kind of talk). For example, what kind of

[40] http://www.telegraph.co.uk/technology/apple/9283706/Jonathan-Ive-interview-simplicity-isnt-simple.html

conscious deliberation? Reflection-in-action or reflection-on-action?[41] And how are other people involved? – as both co-designers and as users or participants in the designed thing.

Getting clarity on this from the very people using the term design turned out to be surprisingly difficult. But they are not to blame. The term has a long and problematic history, being pulled and pushed in many directions over time as systems of production (craft, artistic, industrial and post-industrial) have evolved, and critical-creative discourses have co-evolved in numerous contexts (universities, design schools, radical political and artistic movements, popular culture). Our present confusion is a mix of many influences. The conflation of making and designing might be a hang-over from the division of labour between production and design in industrial Capitalism. When exploring the wild variations in the meaning of the word, Richard Buchanan contrasted Paul Rand's artistic conception of design (as the additional creative-intellectual element added to materials and techniques) with that of the industrial design theorist John Heskett – the design studio and production being two separate business functions to be orchestrated by management (Buchanan, 2001: p.8). Buchanan also finds the conflation of making and designing at play in one of design theory's foundational texts, Herbert Simon's *The Sciences of the Artificial* (in Buchanan, 1992: p.18) – arguing that Simon's subsequent work is flawed as a consequence of this error (I agree, and my concepts draw from an alternative design philosophy). Buchanan's most significant theoretical move is in accepting that design has no definitive subject matter (we design things of all kinds). It is:

[41] Following Schön's distinction in *Educating the Reflective Practitioner,* 1987.

> “An inventive science of design thinking which has no subject matter aside from what the designer conceives it to be” (*ibid*. p.18-19)

No definitive subject matter, but nevertheless there are common traits to *designing* as an activity: *design thinking*, the challenges to which it applies (one type of which constitutes the class of problems termed “wicked”), and the conditions that are favorable or not for designing.

And yet despite this theoretical over-determination of the concept *and simultaneous* vagueness in its common application, the idea that *we design* is very much part of how the University gets made - in committees, informal conversations, in the hard labour of the people on the ground, and through the everyday un-reflected actions of all of the University’s participants. But is this *designing* in any way related to the *designerly world-view* that I have synthesised from my transdisciplinary researches? To answer that I first need to give an account of its concepts, practices, values and challenges. Beginning with the word “design”.

In an address to the Design History Society, the sociologist Bruno Latour stressed the importance of making a distinction between two very different meanings. Firstly, a meaning that he seeks to displace:

> ““Design” in this old and limited meaning was a way to redress the efficient but somewhat boring emphasis of engineers and commercial staff. Design occurred by adding a veneer of form to their creations, some superficial feature that could make a difference in taste and

fashion." (Latour, 2008: p.2)

*Superficiality and veneer* – we should recall the images of refurbished University of Warwick cafés presented in Part One (1.2). It is not that small details are irrelevant, or that there is something inherently wrong with a concern for visual effect. The aesthetic dimension of design is, as will be seen, still essential. Rather, Latour is seeking to displace the idea that design is only about the veneer, the sweetening of a product so as to make it more palatable. And most of all we need to get past this *bourgeois* idea of design, from the Daily Telegraph:

> "A quick flick through the design magazine archives of 2014 will show a number of noticeable trends: marble replaced concrete as the key stoneware of choice, the decadent shine of rose gold took over where copper and brass had become tarnished with their own ubiquity, and the background pattern of the year – visible everywhere we looked – was an ultra-fine graph paper grid, firmly relegating bold monochrome chevrons to ancient history." (Henrietta Thompson, "Design 2014: In Review", Daily Telegraph, 24th December 2014)

And in its place, there is a concept of *designing* as a core part of being human and making the social.[42] Latour defines the concept broadly, as a concept undergoing "expansion" in getting closer to the conditions of life today – which is ever more *designable*. He then skirts around a more precise definition by stating its advantages, which are said to be:

[42] Although one might argue that for the Daily Telegraph "the decadent shine of rose gold" is essential to being human and making the social.

1. The modesty and cautiousness of designing – "…there is always some modesty in claiming to design something anew. In design there is nothing foundational. It seems to me that to say you plan to design something, does not carry the same risk of hubris as saying one is going to build something." (*ibid.* p.3)
2. A concern with how things are constructed, how they are crafted, how they work - "…an attentiveness to details that is completely lacking in the heroic, Promethean, hubristic dream of action." (ibid. p.3)
3. A built-in assumption of purposiveness (meaning), but always open to interpretation, contention and modification - "…when analyzing the design of some artefact the task is unquestionably about meaning." (*ibid.* p.4)
4. Recycling unashamedly at the core - "…it is never a process that begins from scratch: to design is always to redesign." (*ibid.* p.5)
5. It confronts us with ethical questions – "…it necessarily involves an ethical dimension which is tied into the obvious question of good versus bad design." (*ibid.* p.5)

Following Latour's "cautious Prometheus", design is not of the grand scheme and the five year plan, or of marble floors and Hermès en Lumiere, but rather it has a more prosaic *everyday* presence in our lives, whether we are professional designers or everyday designers exploiting the potential of open platforms and craft cultures.

However, the noun "design", referring to a discipline, a profession, a set of concerns, an aspect of human productivity (in the way in which we speak of

the “state of design today”), a blueprint, a solution, a plan - is too broad in its scope. It might also be spoken as a verb: to design. In general use, as Ian Curry of Frog Design notes, it has become “…synonymous with “innovation”; it is both a profession and a process” (Curry, 2012).[43] Curry’s experience of teaching design students today suggests that:

> “While this is an exciting time for established designers to explore the field's freshly unearthed possibilities, design has become a slippery subject to study.”

The task then is to define and deploy the freshly unearthed possibilities, in the form of ideas, making them less slippery, but at the same time retaining their power. To begin with, I will move away from the nebulous “design”, and talk about “a design”, “designing”, “designers” and “designerliness”. Talking of “a design” has the advantage of separating designing from making, with designing being a special form of making – making first a design, and making things following that design. Designing then becomes a distinct mode of activity and thought - although not necessarily separate in time and space from making end-products, we can still operate with a designerly hat on at the same time as wearing a craftwork or manufacturing hat. A consequence of this is that when people say they are “designing” there should be some kind of additional mental or physical entity produced (permanently or fleetingly). Only then does the claim “I am designing” have any substantial objectively appreciable meaning.

[43] In his *design mind* article “The Known Unknowns: Exploring the evolution of design education in response to the industry’s expanding role.”

### *2.1.1 A design*

I define *a design* in simple terms:

> A design is a recognisable pattern of practices and matters, to some extent intentionally constructed and controlled, and used for specifiable purposes. A design is assembled from a range of different types of practices and matters that interact with each other and change dynamically, including epistemic, cognitive, social, bodily and technical. These assemblages help us to respond to the world, consciously or unconsciously, and reshape elements of it so as to address our concerns and to work on our projects (which might, reflexively, concern improving the design of our practices and projects, or reshaping our concerns: *learning*).

The most challenging aspect of this definition is in how it implies that the design, the recognisable pattern of practices and matters, subsists in three places at once:

- In the mind and intentions of the designer, and in the "extended mind" of sketches, blueprints and notebooks;
- In the designed things themselves, as the patterns of practices and materials encoded into things;
- In the dynamic interaction between minds and designed things.

I argue that this is an advantage, so long as we recognise how the concept of *a design* is a composite of these three ideas – and recognise the different

ways of speaking. Later in this part of the thesis (2.2.2) I will detail some further distinctions to do this job: design-in-mind, design-in-use and design-as-experienced. I will show how these distinctions are present in the reflexive considerations of the designers of supercomplex academic things (curriculum design). Different arrangements of *design capability* in an organisation, different approaches to designing (I describe four: craft, professional, guerrilla and everyday) arrange the three aspects in different ways, with the danger of a complete collapse into the immediacy of *ad hocist* everyday designing.

But first, let us dive into the complexities of designed things. Consider, for example, Apple's iOS devices (iPod Touch, iPhone, iPad) – one of the most influential designs to emerge from the ubiquitous computing revolution.[44] They are the result of intensive and ingenious designing by some of the world's best designers – famously including Sir Jonathan Ive. As an object in itself, the device has a beautiful simplicity. And some people do just love its immediate aesthetic appeal to the eye and the hand. But even that is a complex assemblage of physical and cultural connections and cues. In other contexts we might not enjoy the metallic feel of instruments (cold, unresponsive). In other cases that same set of affects connects *transversally*[45] with positive feelings – for example, cutlery and its connection to joyful consumption.[46] Add to that the *glassiness* of the surface and there is

[44] The term "ubiquitous computing" refers to the always available, always connected, context adaptive nature of computing devices today, but did in fact emerge from the work of Xerox PARC as early as the late 70s – see Weiser, Gold & Brown, 1999.

[45] Deleuze and Guattari's term for the interconnections between distinct systems of matter and ideas in assemblages.

[46] Steve Jobs famously once said of the OSX interface: "We made the buttons on the screen look so good you'll want to lick them." Fortune, January 24th 2000. The iOS design takes this aesthetic even further.

enough aesthetic interest for anyone. But the iOS device as an assemblage goes much further than that – its integration into a whole new kind of commerce, through the app store, adds sophisticated social, psychological and economic planes to the experience. Complexity converging through simplicity. And furthermore, it goes well beyond the physical device, into less-tangible designed entities and processes – some of which might be described as "services", others of which we can call "social". To call an iPhone a device is a massive over-simplification, although we have few words adequate to its true complexity (design assemblage is itself still too abstract). Ed Catmull (founder of the Pixar animation studio) discusses this complexity, and the tendency of a great product to hide its complexity from us, in his book *Creativity Inc.*

> "…the iPhone, for example, is not a singular idea – there is a mindboggling depth to the hardware and software that supports it. Yet too often, we see a single object and think of it as an island that exists apart and unto itself." (Catmull, 2014: KL: 1198)

No iPhone is an island. Catmull is especially interested in the nature of the social and personal systems necessary to create and sustain designed assemblages and platforms like the iPhone. He argues that "Ideas come from people. Therefore, people are more important than ideas." (*ibid*. 1192) And what he means by that is that the iPhone as an idea stands for assemblages in a platform created out of supercomplexity:

> "Ideas, though, are not singular. They are forged through tens of

thousands of decisions, often made by dozens of people." (*ibid.* 1194)

Dozens of people? In the case of a movie, maybe (although the credits at the end of a Pixar movie scroll on for several minutes). In the case of a platform as ubiquitous as iOS, then we might to some extent include the billions of users who over time have shaped it in dynamic interaction with a smaller core of designers. But even then, with all of that supercomplexity, the designed thing is organised according to what we might call *design ideas* – each of which is an idea or proposition that arrangements of things, actions and interactions leads to more or less definite ends of a certain type (although in some cases there is still an openness in the exact nature of those ends, as the designed thing is applied in different situations). Design ideas are what we notice in designs, around which we invest, however fleetingly, our attention and energies. And in return sometimes they give us delight.

In the University context, the revolutionary nature of the iOS device-platform-ecosystem (and more) assemblage is evident when people gather together with their devices and share recommendations – apps are downloaded and in use within seconds, with practical know-how about *design ideas* spreading across social networks, or even random meetings, in a way that was almost impossible in the pre-ubiquitous computing world. So not only is it a designed assemblage, it is a component in an ongoing socio-economic-cultural revolution in which *design ideas*, designed things and user-contexts dynamically interact. 140 grams of revolutionary potential in my pocket. Only potential – of course it takes a lot more than that to spark and sustain a true revolution.

Thinking once more about the University, we can also draw a parallel between:

- the spread of design ideas and practices through the iOS platform, carried by apps and facilitated by the social nature of the ubiquitous computing approach;
- the spread of academic ideas and practices through platform-like aspects of the University.

The University as a platform?

But before this turns into yet another adjunct of the Apple marketing division, we need to avoid conflating the supercomplexity and revolutionary potential of a designed assemblage with a naturally emergent moral good (avoiding a deontological fallacy). As will be argued, designs are value-laden. Humans graft values into designed assemblages as a special kind of component. And in return, designed assemblages shape our values and moral judgements, unconsciously and through reflexive deliberation. Sometimes when Apple products are matters of contention, this morality reaches almost absurd degrees – the iPhone was not responsible for the Arab Spring. The discovery of and expansion in this moral aspect of design, as Latour argues, has become the focal point for late-Capitalism's everyday philosophical discourse. The conflict of the platforms has perhaps replaced the great debates of the nineteenth and twentieth centuries (but rethinking, for example, Communism through the lens of *platform Capitalism* might revitalise its arguments).

A design then can be at the same time and in the same place beautifully simple and sublimely complex.[47] The sense of its beauty, and other such aesthetic characteristics, comes from the connection between the recognisable pattern of practices and matters, the design ideas and values encoded into it, and the values in which we wrap our use and experience of the design.

### *2.1.2 Assemblages and platforms*

My concept of design precedes this research project, in its derivation from the philosophies of Gilles Deleuze, Felix Guattari, Henri Bergson, Friedrich Nietzsche and, less directly, Gabriel Tarde[48] - and in its opposition to Herbert Simon's classic[al][49] definition of design. However, it has been greatly enriched by the project and through an engagement with practicing designers – of both the professional and everyday varieties. *This is the main philosophical contribution to the thesis – an assemblage theory of design (following Deleuze and Guattari).* It acts to raise the idea of design to the level of significance that it deserves, and to allow for the increasingly open and synthetic subject matter of design today. As Buchanan argues, design has no definitive subject matter. I go further, and argue that the subject matter of design is expanding all the time, combining and exploiting diverse systems – for example, learning technologies combine cognitive, social, cultural,

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[47] Thus upsetting Kant's division between the beautiful and the sublime given in the *Critique of Judgement* (1790).

[48] For more background concerning the philosophical roots of these ideas, see my chapter on "Viral Empiricism" in *Deleuze and Philosophy*, Ansell Pearson (ed.), 1996.

[49] Richard Buchanan points out the connection between Herbert Simon's *The Sciences of the Artificial* and Aristotle's *Poetics*. Simon's thinking harks back to classical thought in many ways. (Buchanan, 1992: p.19 side-note 49)

linguistic, software, hardware, biological and many other systems, all of which might make a difference to outcomes, and which therefore are matters of importance to the designer – the subject matter for learning technology designers is extensive. To make things even harder, each of these distinct systems varies in space, between people and over time. Creating a theory of design applicable to this supercomplexity is quite a challenge.

The first part of my definition states that:

> A design is a recognisable pattern of practices and matters, to some extent intentionally constructed and controlled, and used for specifiable purposes. A design is assembled from a range of different types of practices and matters that interact with each other and change dynamically, including epistemic, cognitive, social, bodily and technical.

This is an *assemblage* theory of design. It aims to be true to the dynamic and supercomplex nature of designed things today, without losing the sense that designs are definite and specific things or events distinct from the supercomplex worlds in which they exist.

Assemblage theory is a way of thinking about designs and their implementations as *definite* things that find their meaning as embedded in complex, open, *indefinite* contexts. We have seen how from one perspective the iOS device works because of its beautiful simplicity, but also by extensions through its *plugging-into* a platform, and (most importantly, as this

is how it has impact) its transversal connection across platforms (e.g. Apple and the social). And then we can go further and examine its role and its determination through many other orders – biological, aesthetic, cultural, economic, political etc.

The precise nature of each of these connections to and from the hardware and software may vary in each instance (my iPhone leads a relatively dull life compared to that of a Palestinian activist on the front line at Gaza). But each of these individual configurations might change – more or less independently from the specifically technical platform. I might become an activist. A *design idea* that is embedded in the device might then take on a different meaning for a radically different use. I might even add new apps to give the device a different life. To complicate matters further, my iPhone and its potential connection with Palestine play a significant part in that reconfiguration. And perhaps my connection to the technology has an unconscious influence upon my attraction to becoming an activist, forming the purposes for which I intend my actions.

And at the same time, the platform is slowly evolving in relation to, and perhaps influenced by, these mutliplicitous reconfigurations – with each of the other orders reconfiguring at different speeds (culture evolves faster than biology, but one day, biology might catch up – and who knows what is happening to the workings of our brains as we become increasingly connected through the ubiquitous web). The differences between these rates of change, and the complex dynamics between them, are sometimes experienced as dissonant. One of the tasks of the designer is to carefully

judge and alleviate such gaps – for example, between the capabilities of a device like the iPhone (e.g. in-app purchases) and the social situations into which it is deployed (e.g. the relationship between parents and children).

The ways in which designed assemblages feedback into and change the platforms upon which they are based are then design considerations – the core iOS software platform, for example, is constructed with layers of protection such that change is controlled by a small team of professional designers and engineers at Apple – a kind of immune system is built in. Sometimes they get it wrong (the original implementation of in-app purchases).

The recent history of designs, or history seen from a designerly perspective, is however increasingly supercomplex and dynamic – what the philosopher Manuel DeLanda calls “non-linear history” (from his book *A Thousand Years of Nonlinear History,* 2000). This growth in dynamism, the speed with which platforms evolve, and the spread of participation in changing platforms, leads away from the more static conception of designs, to a world of designs and platforms that are modified by their users and to an increasing degree, are self-modifying.

Designing is still, even with these new dynamics, a production of *definite* things and their inter-connected *definite* purposes through the production of an *implementable* idea or plan. A design is as such built around knowledge, assumptions, theories – ideas about the world and about us as users. And much of the work involved in creating and refining designs concerns

producing and evaluating these encoded ideas. But the speed and flexibility with which this can take place has increased – bringing significant change to how we do designing.

Designs are now often, at the same time as being definite, open to and a cause of the *emergent inventiveness* in the open systems in which designs are deployed – they are both definite and indefinite. In their designs, designers specify systems of constraints, affordances, enabling constraints, affects, workflows etc. – as ways of carving out, making definite, and creating an at least temporarily-ordered and stable time and place. Finitude and definition amongst all of this supercomplexity. But they also include speculative aspects, degrees of free-play and openness, and they theorise about the consequences of openness (in software platform design, we think about these issues all of the time, carefully seeking a balance between enabling unpredictable creativity and insulating the system from damage). Designs both enable and restrict openness. Unsurprisingly then, humans become so attached to designs as enduring engagements, as places of calm and places of empowerment (my son is right now furiously blasting storm troopers on a computer game, but it is from this perspective a well ordered calmness).

Deleuze and Guattari's concept of the "assemblage" has proved most useful in understanding this. Manuel DeLanda gives an accessible account of these ideas in his book *A New Philosophy of Society: Assemblage Theory and Social Complexity* (2006). DeLanda demystifies Deleuze and Guattari, showing how their concepts fit neatly with early 21st Century ideas and

experiences. To begin with, he differentiates assemblages from “organic totalities” (DeLanda, 2006: p.10) – organic machines made only from parts that cannot exist independently from the whole machine. If you chop off my leg, it’s not going to walk around on its own. Similarly if I pull-apart my mechanical watch and spread the components across the table, I just end up with a pile of inanimate metal and glass bits. It neither ticks nor tells the time.

So a human body *tends* towards being an organic totality. In the same way a mechanical wrist watch *tends* towards being an organic totality. But in each case the totality is never complete nor final – it is not the whole story. A person is not an entirely organic machine - this is the core argument in Deleuze and Guattari’s *Anti-Oedipus* (1972/1983). For each person there is a clear sense of unity, definition, being-there-ness. Without that, we literally fall apart. And at the same time we can analyse a person into multiple components belonging to multiple orders or (to use a 21st Century term) platforms. Indeed when we try to pin down the precise nature of the person, we end up with a collection of diverse traits belonging to other systems. And that leads us to ask: Whose DNA? Whose language? Whose property? Etc. – we start to feel quite uncomfortable when we take into consideration the discoveries of psychology, sociology and behavioural economics, illustrating how our thoughts and actions are subject to unconscious biases and influences over which we have little control. And furthermore, we can look at the person over time and see those different platforms changing, more or less independently from each other and the person. These arguments should sound rhetorically familiar – the same analytic technique was applied above to the iOS device. And in both cases, the device and the human, despite

being composed of multiple *transversally connected* and independently changing platforms, they retain their definition and the sense of totality – my iPhone and me. The recent extension of the iOS platform into wearable technologies takes the design as transversal assemblages even further – the Apple Watch translates the wrist watch into the digital realm as a virtual (not mechanical) machine simulated on a ubiquitous computing device, with yet further potential to transform the conditions of being human - bio-sensitive and network connected.

Although of course humans are more complex and have a different kind of intelligence beyond the machines that they produce, of which designerly reflexivity may be a key aspect (more on this soon).

DeLanda then introduces some terminology refined from Deleuze and Guattari. He talks of these *definite and open* things (people, iPhones, organisations) as types of *assemblage*. Such a thing is composed from components built out of different platforms (although sharing in some platforms – for example physical matter, and in some cases the linguistic system of expression, and increasingly also the digital). The components are themselves "wholes characterized by *relations of exteriority*" within the assemblage (DeLanda, 2006: p.10). They are what computer programmers call *loosely coupled.* In DeLanda's abstract terms:

> "…a component part of an assemblage may be detached from it and plugged into a different assemblage in which its interactions are different." (*ibid.* p.10)

Words, for example, are component parts in assemblages, selected from the continuously evolving platform of the natural language (which is itself a supercomplex cultural assemblage). A conversation is an assemblage of words, detached from one context and plugged-into another (just as DeLanda detaches words from the context of IT and plugs them into philosophy). Every word has a material and cultural life of its own within the platform. But it also has a free-play across contexts. And we can select and assemble words into a conversation, drawing from aspects of that independent material and cultural life. By assembling words into a conversation we make new meaning out of them. As DeLanda says:

> "…relations of exteriority guarantee that assemblages may be taken apart while at the same time allowing that the interactions between parts may result in a true synthesis." (*ibid.* p.10)

That is to say, the detachability (relations of exteriority) of components does not compromise the ability of components to stick together and affect each other through definite interactions in definite assemblages.

Detachments and reattachments (into assemblages) then may occur with only a tenuous degree of feedback, or none at all – in the case of words, between our use of the word to the word as a part of the platform from which it is selected (it is loosely coupled). The platform guarantees the integrity of the word, although not its complete meaning. An assemblage is then a kind of *ad hoc* production from platforms – but at the same time, a definite and

consequential assemblage in its specific time and place, affecting platforms other than the natural language from which it is constructed, and perpetuating, modifying or taking apart assemblages connected to the conversation.

In some special cases, we *design* an assemblage to maximise the feedback between our use of a component and the platform from which it draws – in political rhetoric, advertising and poetry words are often deployed so as to change language. Computer programmers have their *Integrated Development Environments* (IDE) and the self-extending system of *Object-Oriented Programming* (OOP) and code repositories, through which software platforms are developed by many people over time. University administrators have their committee systems and hierarchies. Project management, change management, democratic constitutions, protest movements – they are all assemblages for modifying the platforms from which they are assembled.

The scope to which this kind of thinking may be applied is broad. In this way we might consider poetry to be a form of *platform engineering* – although it does much more than that, and claims an ethical-aesthetic position above politics and advertising. Different disciplines assemble things in different ways. Poetry creates and energises assemblages, connects across to other assemblages, and *sometimes* modifies platforms (language, the body, culture etc.) in a way that is superior to different uses of the same natural language. Writing poetry (and drama in the classical sense of Poetics) is as such a different kind of designing to the platform engineering of politics. How is it different? That is a contentious question. But we might argue at least that it

has a different moral dimension, different values implicated in its assemblages. Aristotle thought so. And Richard Buchanan uses this to make an essential point against functionalist theories of design:

> "Aristotle carefully distinguished the science of the artificial from the art of rhetoric." (Buchanan, 1992: p.19 side-note 49).

Poetics is a specific form of poiesis (creation of artifice) distinct from the rhetoric of politics. It is made different by its values, by its ethical character, which is itself a human product going beyond the human. As Buchanan points out, Herbert Simon (one of the most functionalist of design theorists) acknowledged neither this history of ideas (in the humanities) nor the fundamental diversity of designing and designs. In *The Sciences of the Artificial*, Simon posits a simple organic *homeostasis* at the core of all designing and designs:

> "...the designer insulates the inner system from the environment, so that an invariant relation is maintained between inner system and goal, independent of variations over a wide range…" (Simon, 1969: p.8)

But as we have seen, that only accounts for some cases of design – cases that start from the complexity of assemblages, components and platforms, and add constraints so as to make components more highly coupled *despite* variations in the platforms and assemblages upon which it acts. We might, alternatively, talk of a form of *poetic design*, which does all of these things and at the same time plays with components slipping between highly coupled

and loosely coupled relations. It would be a kind of knowingly playful and open kind of design[ing] in which conventions are established, protocols are made clear, but with an open-invitation to break those rules, to go beyond the platform and its assemblages as it is laid out. Breaking and rearranging the design as built-in to the design.

### *The Warwick Writing Programme as a rich platform for creative and designerly assemblages*

These seemingly philosophical ideas lead us into a real design study of an academic department at Warwick. A department that works as a carefully crafted *platform* and set of assemblages, designs acting to concentrate, intercut, animate and change other platforms through the medium of poetic design: the Warwick Writing Programme. Why choose what might seem to be an *edge-case* to illustrate the application of these concepts to academia? With a little imagination we can interpret most academic activities following the model described in my definition of *a* design: "…assembled from a range of different types of practices and matters that interact with each other and change dynamically, including epistemic, cognitive, social, bodily and technical." It might even seem banal. The interesting cases illustrate how those different platforms work asymmetrically, loosely coupled, and how *design ideas* temporarily suspend those disconnects so as to get diverse platforms and their assemblages coordinated towards the production of a new synthesis, a transition to a new state – a significant event of passage and transformation. The Warwick Writing Programme, as embodied in both its physical space, its values and its practices, is designed and constructed purposefully to do that job. As such it provides a perfect example of just how sophisticated designs can be in the University. It is not alone in this, as will be

seen in other design studies further along in this thesis. But it is one of the most self-consciously designed of the cases that I have studied.

What then is so special about the Warwick Writing Programme? The Programme is part of, and developed from, the Department of English and Comparative Literary Studies. However, it is (as of 2014) significantly different, being oriented towards the production of writing and writers. Critique plays a different but equally important role in the Programme – working in the interests of self-critique. Professor David Morley (Director of the Programme until he took over running the English Department in 2014) gives the kind of advice that writers find both inspiring and deeply challenging. For example, that infamous adage: “It’s easier to murder someone else’s darlings than your own.” (Morley, 2008). Brutal advice. But at the same time this is softened and supported by a physical  environment deliberately designed to encourage a positive and sociable outlook. Writing is hard. Writing and being self-critical is even harder. Writing and helping others to be self-critical can be just downright dangerous. It needs to be nurtured. The Writing Programme’s headquarters is setup to do just that. Since 2012 it has been based in Milburn House at Warwick, ten minutes away from the English Department, in a building that also houses History of Art and Theatre Studies.

*The Warwick Writing Programme. The fairy lights stay on all year. The walls are decorated with poetry and artworks to inspire creativity. A small seminar room sits just to the right.*

*The Writers' Room arranged as an open space. The sofas are usually arranged to fill half of the area. The whiteboard fills the full length of a wall. David Morley's telescope is a vital piece of equipment. An iMac and bookshelves are just out of shot.*

The Writers' Room is especially important. A specialised space developed by creative writing teachers in which students will cope better with "losing":

> "Let us focus on one world experience we all probably share: humiliation. Humiliation is a position from which many writers work; it is the private face of the art of losing. The demands of working and shaping language lend themselves to humiliation as well as humility." (Morley, 2007: p.47)

The Writers' Room contributes to the creation and maintenance of the Writing Programme as platform for creativity and self-transformation. All of its characteristics are engineered with safety in mind – but safety serving to allow experimentation and risk taking. The balance is carefully managed by the teachers and by the students themselves – learning to manage risk is essential to becoming a successful creative writer.

In 2011 I interviewed George Ttoouli, a Warwick Writing Programme tutor, about his use of the Writers' Room and other spaces in Milburn House. The CAPITAL Centre created and managed two more *theatrically* styled rooms: the Rehearsal Room (a large stark white open space with a sprung floor) and the CAPITAL Studio (an even bigger black box with a sprung floor). This was within the context of other experiments with alternative teaching spaces at Warwick, including the Reinvention Centre and the Teaching Grid (more on these soon). This is what George told me:

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### *Interview with George Ttoouli, Warwick Writing Programme*

The Writing Programme had acquired a new space in the CAPITAL Centre at Milburn House, the Writers' Room. It belonged to the Programme, but was looked after by CAPITAL. We also started to use CAPITAL's other spaces, the CAPITAL Studio and the Rehearsal. There was an imperative to change pedagogic practice to exploit the new spaces to the full. Moving into non-traditional spaces of this kind was a new thing, a challenge to a long established programme more used to operating in the traditional academic spaces of the Humanities Building. However, there was already some innovative use of space, especially outdoor spaces.[50]

One module in particular, a third year practice of fiction module, took place in the rehearsal room on Thursday mornings. It had been taught in traditional seated spaces in the past - no one got up and moved around, there was no technology, no mobility. This move *forced* the translation of the course content (I had been teaching the same materials for a couple of years). After some time, this also triggered a change in the content itself, choosing content more suited to the space. However, some teachers simply recreated traditional teaching spaces in the new space. Student expectations were challenged by these changes.

We addressed the challenge through a conscious engagement with the learning environment and the enhanced access to technology. The Writers' Room was furnished and equipped collaboratively, led by David Morley. He

[50] David Morley is an especially innovative user of outdoor spaces for teaching, including the nature reserves and woodland surrounding the University. Poetry writing and tree climbing are sometimes combined.

shared design with the group. The AV system was specified by CAPITAL, following the same setup as their other rooms. I was given some control, the permutations were discussed in the Writing Programme, but use of them not discussed collectively. So individual teachers had to make self-led decisions.

Taking cues from David Morley, Peter Blegvad[51] and CAPITAL (who provided group sessions and training), we created a foundation for thinking by imagining "pitches" for existing course content. To a point, very quickly you realise that there are better texts, or writers to cover, texts that work better with this new setup. I was originally using Bradbury's short stories in the MBSS (UK, but old, and odd choices). For example one story I used was Beckett Ping. I would get a different person to say the word “ping” each time it appeared in the text - this transferred well to the new performance related space. It helped the students to get into the activity, with a different style - the rehearsal room - allowing the sense of trying and failing to be OK.

I then started working towards choosing texts that lent themselves to the changed spaces, e.g. being able to move more. Further, as in my artistic practice so in pedagogic practice, you learn the form by testing its limits. Push it to the limits, break the limits, find new limits. I knew I was moving in the right direction through tacit on-the-spot observations, e.g. how much they are being challenged. disaffected students are a good gauge. In Flow, Csikszentmihalyi talks about upper and lower bounds to the learning zone, so I rationalised this nearing the upper limit as uncomfortable, nearing the lower limit as comfortable. Between the range the experience is successful.

[51] Peter Blegvad, a musician, songwriter, comic book artist and teacher.

Students lose a sense of being in the classroom. They become emotionally and intellectually engaged in the content, being active producers within that context, producing exercise responses freely, exploring and offering peer review etc.

There was one point in the change phase where I especially tried to change the parameters of the learning environment, in the Rehearsal Room. I used technology to change it from being a safe space to an unsafe space. I aimed to create a psychological environment in the classroom, started by putting a poster on the door with a disclaimer saying any student entering the classroom consented to having their image recorded for evaluation purposes (students could miss the session if they disagreed). As soon as they entered they were being filmed and audio recorded. Video displays in the room were used to bring a forest environment into it, interrupted by a prerecorded mobile call. I exposed them to brainwashing techniques. And then it became a lecture on brainwashing (Ballard). I recorded the lecture and played it back to them. There was a point at which I had to be aware that student safety was being challenged. I left the room at one point. Finally, it was followed by a debriefing to bring them back to reality.

This took a lot of work to stage *safely*. The limited technology that was available limited what was possible. The quality of recording and projection was too low. The Rehearsal Room space was too constraining. Relying on a single voice made it too annoying, and student voices not part of it enough. Projection was limited in layout. It can be hard to innovate within University purchasing and service provision bounds. But we have to take the "outsider approach", and make do with what is available.

I took away a number of failures from this and didn't repeat it in full. But much was learned and achieved. There was a localised transfer of the technique of using technology to disrupt the obvious approach to textual analysis - used in a smaller version - as a writing exercise carried through to other classes. It also spread to other people and contexts, especially through students, who have carried on and are doing postgraduate study, and through change in relation to Ballard and the writing process. It received a very successful response from students it had not connected with before.

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### *Risky assemblages made possible by sound platforms*

To an outsider, George's experiments might seem *too extreme*. But in the context of the Writers' Programme as a platform for design experimentation, they were well judged. The students had the safe space of the programme into which they could move and decompress after the session. During my research, I observed other cases in which risky student activities pushed the participants beyond their comfort zones. One of these experiments was actually called "The Risk Factor". It was designed by Ruth Leary of Cultural Policy Studies, and involved masters level students in a "dragons den" style scenario – but with no chance to prepare. Each student entered the black box CAPITAL Studio space on their own to find themselves faced by three masked judges sitting at a desk. They were then given a topic to improvise upon immediately.

A year later, I interviewed an alumni who had gone through the Risk Factor experience.[52] Anthony Lynch (freelance media consultant and producer) explained his feelings retrospectively. He told me about the long-term impact that the session had on him. Although at the time it seemed confusing and stressful, eventually the value grew as he made his way through the world of work (in the creative industries). The design of the session gave it enduring impact. I asked him if the physical configuration of the session helped him to later recall his achievements *on the spot* in job interviews - the harsh spotlighting and the arrangement of the desk and the judges, and Jonny Heron (of CAPITAL) acting as the showrunner. He agreed. I asked him if there is a recognisable Risk Factor kind of thinking. He agreed, saying that it is a kind of response "channelling your fight or flight into something useful". But most importantly, each student was debriefed afterwards in a positive and supporting way, so as to deepen the reflexive appreciation and the enduring impact. Finally, I asked if in ten years time he would still remember it – he said "yes, it was a very memorable learning experience…there are fascinating lectures, there are fascinating seminars, you sit down and learn interesting things, but it's the content that you remember, not the delivery, and I think of this [Risk Factor] I remember both, and each equally important to the learning experience, its not only what you learn but the way in which you are learning it, but that is not a gimmick, the way in which you are learning it is completely entailed in what you are learning." Does it give him a kind of empowerment? "Initially not, initially it was a rabbit in the headlights, what's going on, but you do ultimately…it's like learning to drive in a car park, its going to be a safe environment, you're not going to lose out on career opportunities from it, but

[52] The full video of the interview is available at https://www.youtube.com/watch?v=mY1mtD8wWwg

you can go away and assess it." This is, I believe, one of the most sophisticated of learning designs, produced by master designers within the context of a set of well-engineered and appropriate platforms (Cultural Policy Studies, the MA level culture in the department, the CAPITAL Studio, the support framework from the CAPITAL Centre). And it combined perfectly a set of other platforms – including the physical-cognitive coupling of the student. The result was an enduring event, still active in the lives of the students, with components of the assemblage living on in their future lives and being reactivated as powers upon which they draw in similar situations (job interviews for example). And at the same time safety was built in to the risk, well considered and assured by the platform.

The Risk Factor was as such one of many designed assemblages that I encountered demonstrating the complexity and sophistication of designs and designing in the University – illustrating the need for a more comprehensive theory of design and designing – and leading to the findings and theories documented in this thesis.

**In terms of the assemblage theory, we can see how in George Ttoouli and Ruth Leary rearranged familiar components, taken from previously loosely connected platforms (nature, texts, music etc.) - reassembled in a new synthesis.**

This was well-coordinated, well designed according to a definite plan and patterns, so that the minds, memories, bodies, social relations and capabilities passed a threshold (pre-experience, post-experience) and were

*transformed*. Furthermore, what each student made of the experience varied. For some it passed by only to have a subtle, indefinite, lingering effect. For others it led to more immediate and definite action. The departmental platform then gave a conduit for exploiting what they had taken away from the experience – another key aspect of the design. The Writing Programme, for example, helps writers to take their ideas and build them into a "sellable" end product (a book, a poem, a performance) – as such not only does it develop ideas and people, it develops enterprise. The richness of George Ttoouli's account is almost too great to summarise - and that only represents some of the elements of the Writing Programme platform, assemblages and innovative design experiments. But we can identify characteristics that stand out as *designerly* and which tell us a lot about the Writing Programme's culture. Some points will recur throughout this thesis – for example, the *designerly* methods used to adopt-adapt-co-adapt in the space; the exploration of affordances and constraints; the pitching and catching of design ideas; the recycling of components from the designed assemblage; the acceptance of the value of collateral learning from the edges of the experience; the powerful *designerly reflexivity* in operation throughout but especially in the account of the design innovation; the role of design history and design knowledge produced out of the reflexive consideration of designing. But for now let it serve its purpose in illustrating the sophistication of design assemblages and platforms in the University.

We can also see this at work most clearly in the transformations of many of Warwick's original 1960s buildings. New spaces, often radically different in style to the original buildings, have been *grafted-onto* the old designs. But it is

not just a physical grafting-on. Each addition contains a set of design ideas very different from the original. Are they adaptations of the building's DNA? In reality they look  more like parasitic growths – but in each case the additions work well, reconfiguring the platform. But there is a level of discomfort in that reconfiguration, a risk.

**New spaces grafted onto old:**


*The Law School extension to the Social Sciences Faculty building.*


*Café Library, a glass and wood design grafted onto the original 1960s Library building.*

*The Engineering Department social space, grafted onto the original Engineering building.*

**Adaptive reuse of existing spaces:**

*The 1960s interior of the original Library building was transformed almost beyond recognition into a clearly differentiated range of study spaces in various formats to support different modes of working. Décor and furnishing was done to a very high standard.*

At Warwick, both the Reinvention Centre and the CAPITAL Centre demonstrate a continuity between the designing of physical spaces as "adaptive reuse"[53] and the redesign and reinvention of other forms of educational assemblages and platforms. The CAPITAL Centre had its theatre inspired studio spaces. The Reinvention Centre had the Reinvention Studio (a converted bar). When the two CETLs merged, the spaces continued to be looked after by the resulting Institute for Advanced Teaching and Learning, which has since developed further flexible learning spaces based upon the lessons learned from the CETLs.

*Teaching in the Reinvention Centre*

I have used the Reinvention Centre for design workshops taught as part of the MA in International Design and Communications Management. It provides

[53] In an Times Higher Education article on "Six Trends in Campus Design" (11/12/2014) Chris Parr lists *adaptive reuse* as one of the six. http://www.timeshighereducation.co.uk/features/six-trends-in-campus-design/2/2017412.article

a flexible, bright, informal and comfortable space, used as a base for the creative aspects of the projects. I have experimented with all of the new open teaching spaces at Warwick, and eventually settled on the Reinvention Studio as the best fit for my needs. A brief report on my 3 Spaces Experiment was included as part of the Open-space Learning Project.[54]

### *Cath Lambert's Psycho Classrooms as platform re-engineering*

The sociologist Cath Lambert gives an inspiring and challenging account of her use of the Reinvention Studio in her paper on "Psycho classrooms: teaching as a work of art" (Lambert, 2011). The Studio provided Lambert with an effective platform for exploring the aesthetic dimension of learning. I rate this as being an even more radical design innovation than those described so far – and consequently I use it to illustrate just how liminal learning design can be whilst at the same time retaining its integrity and purpose – definite and radically open, usable and disruptive. Lambert begins with this definition:

> "Psycho classrooms, then, refer to sites of dissonance and critique in and through which the potential of space to influence pedagogy can be realised." (Lambert, 2011: p.28)

Why would we want such spaces? She tells us that:

> "Such classrooms aim to disrupt the habitual impulses and relations of teaching and learning and invite adventurous participation." (*ibid.* p.28)

[54] 3 Spaces Experiment, a case study on the OSL project web site - http://www2.warwick.ac.uk/fac/cross_fac/iatl/activities/projects/osl-final/technology/case_studies/3spaces/

Imagine sitting in an steeply-banked lecture theatre, legs getting numb through confinement in a narrow and uncomfortable space. The numbness spreading to the mind, tuning out from the slow monotonous progression of PowerPoint slides accompanied by the voice of tedium.

That is of course an exaggeration. But it points to a common image of learning becoming habitually un-thinking through close-to-zero student participation. There is then a pedagogical argument for some other more active approach. But Lambert has a more powerful reason to disrupt the habituated from their slumbers:

> "The aesthetic and material design and usage of such spaces works to disrupt and redistribute what forms of knowledge might be sayable, audible, visible and do-able: for example, psycho classrooms should enable the generation and deployment of embodied and emotional knowledges." (*ibid.* 28)

Along with her students, she is motivated by the political and ethical dimensions of the Student as Producer. Participation in the production of knowledge and of forms of agency that put knowledge to good use. This she connects to the Critical Pedagogy and "…the role of hope in reimagining a different future through pedagogic transformation…" (*ibid.* p.30) The Reinvention Studio is then activated as a place of hope. It attains an ethical dimension to its design idea. Or at least, the potential for that dimension is enabled in its material being. The collaboration of teachers and students then comes together to add a life to it, to turn it into a project towards the

production and application of shared values and goals. Lambert describes an implemented design for learning, using the Reinvention Centre, that produced a project around "…art's ability to have a productive role in the social world." (*ibid.* p.31). Her design challenge is to make this possible within the constrains to the University and the curriculum *as is*. The solution is constructed around the *generative idea* that in art we can produce space in different ways, demanding an imaginative response out of constraints, and consequently producing new knowledge relative to those experiences:

> "Such art practices have been driven by a desire to not only generate alternative spaces but also alternative forms of knowledge." (*ibid.* p.32)

And furthermore, for such artistic experiences to work, connecting space, bodies, minds and knowledge, a pedagogic aspect is essential – learning to be, become and to make (together) in these new unfamiliar spaces. This is then explored in the context of the "Copenhagen Free University" – but read in the context of an "…educational designer, or university lecturer, working within the often 'impervious walls' of the Un-Free University…" (*ibid.* p.32). Lambert stresses that the most important lesson to learn from this, from the relation between art and pedagogy, is the expectation of imaginative response from participants – and consequently a designing to encourage and facilitate imagination. This draws the student into greater participation, allowing them to legitimately bring into action experiences and abilities from beyond the University. The platform is then opened-up to greater connectivity, and the agency of the students increased by removing un-necessary barriers.

How then may these design ideas be implemented? Lambert describes alternative aesthetic-spatial structures that can be constructed in the learning space – forms of "haptic architectonic" (from Rugoff, 2008). An installation by Ernesto Neto is her inspiration. She states that:

> "I would have loved the opportunity to hold a seminar within this pod-like structure, the size of a large meeting room constructed from wooden supports with transparent stretched Lycra constituting the 'walls'. You enter through an oval aperture into a sensual space in which sacks of spices hang in the material ceiling." (*ibid.* p.34)

And this provides a sense of "collective sheltering" in which visitors are able to "share in a delicate game of desire" (*ibid.* p.34) – delicate as the interchange between students exploring difficult knowledges for the first time.

So that describes the design ideas motivating Lambert's innovations. But how could it fit into the Reinvention Studio? To some extent practical issues add constraints – the Studio is a good platform, much better than an ordinary teaching space (the heated sprung floor makes a big difference). But it is still a relatively general purpose space – a platform that affords a range of configurations. In the end, the students and the teacher enliven and go beyond the constraints of the space with their design ideas, which in Lambert's case are animated by hope and care. The place and its activities, within the institution, are a contradiction – always constrained by rules transcendent to the collaboration. But in the event good design may radically reconfigure platforms and assemblages to go beyond those constraints. In

2014 by chance I met up with a sociology graduate who had been part of Cath Lambert's experimental teaching. The graduate is now working with Catherine Allen at Touch Press. She spoke of Lambert's teaching in glowing terms, and was (as with Anthony Lynch) able to describe detailed aspects of the design and the enduring positive impacts that it had on her.

### *Going digital, extending the classroom*

The three examples discussed so far (Writing Programme, Cultural Policy Studies, Sociology) are very much radical cases. They work to foreground the design dimension of pedagogic innovation. However, the underlying principles apply to all University teaching – although more often platforms and assemblages are not radically reorganized – their evolution is of a less deliberate and visible type. The reality that we face in teams like the Academic Technology Service is that design innovation happens slowly, and that many people in Higher Education seem to be locked-into their existing platforms, which are well populated with often complex assemblages (especially with regards to the organisation of assessment, as we discovered in 2013-2014 as we developed the Tabula system for assessment workflow and personal tutoring). As will be seen later in this thesis, such "lock-in" may be tightened further by innovation. The hard work of adopting and adapting to the new can reduce the energies available for further innovation. Where complex solutions are built for complex problems, people tend to *stick* to that which *fits*. In these cases, *spread* does not happen organically. Worse still, the complexities in which a designed assemblage emerges (the platform and the ragged accumulation of accidental complexities around the platform) mitigate against people from outside of the context understanding the value and workings of the design. Complex platforms and assemblages, no matter

how well engineered, may then work against the growth in design capability necessary for an even distribution of good designing across the institution.

In a campus University like Warwick, platforms and assemblages are largely oriented to live, face-to-face events. The challenge of introducing digital technologies to enhance teaching and learning is an especially good way of illustrating the power of platform lock-in. At Warwick, I have been working on this challenge for many years. More recently, we have evolved a way of thinking about *technology enhanced learning* that integrates with existing campus based practices, providing a smoother route to adoption-adaption. We call this The Extended Classroom. My definition of this comes in two parts:

> Discipline-focused interactions between students and academics are the most important element of higher education. Everything that wraps around such interactions, including technologies, environments and support services should be designed to *amplify* and *sustain* their value. We call this wider infrastructure, and the design value putting the academic-student relationship at its core, the Extended Classroom.

The first part is written to encourage all academics to *recognize* their own practice and challenges in the idea. The second part is then potentially more challenging:

> Using new technologies and techniques we can take this basic principle much further. The idea is this: high quality opportunities for

people to learn, to teach, to collaborate and to think should never be unnecessarily constrained by physical location, availability in time, disability or ownership of specific technologies.

People should be able to participate in academic activities, on an equal basis, regardless of such constraints and using the devices and media that suit them best. They should be able to *flow* academic activities continuously across multiple times, places and participants as required, with no additional effort necessary, making the most of the academic-student interaction.

The Extended Classroom helps students and teachers to be better prepared for class, better equipped in class and better able to continue learning after class. It enables consistency across the student experience.

These ideas have been introduced to a range of academics at Warwick, so as to gauge their reactions. The first of the parts seems less controversial. The second part causes widely different reactions from different academics – those who have worked in more of an online distance learning approach are more comfortable with the idea of a single platform that removes barriers. For others, it is a provocation – a threat to the habitual platform and the constraints that it imposes.

This counter example illustrates the power of platforms and the defensive kind of conservative designing that they encourage.

But the world of design, platforms and assemblages is changing.

The virtualisation and digitisation of things, ever-more inter-connectable and reconfigurable, means that fewer of our designs, fewer of the things that we encounter in daily life, follow the more highly restricted formats (they are still there, but their dominance is fading). The designerly world-view then is turning its attention towards these more complex kinds of design and designing – hence the concern with platform engineering of all kinds. Such concerns are very much central to designing in the University, where we have an especially supercomplex challenge in designing platforms and components that are flexible, usable, interoperable and resilient.

Now, having introduced the concept of assemblage and illustrated how designing today works through assemblages, components and platforms, we can see just how we have travelled in putting design and designing where it deserves to be, away from this meaning of design:

> “Design as we have understood it in the twentieth century was then regarded as a servile activity, practiced by artisans who possessed practical knowledge and intuitive abilities but who did not possess the ability to explain the first principles that guided their work.” (Buchanan, 2001: p.5)

Questions of design are, as Latour suspected, fundamental to history, the future of the planet, humanity and the University.

### *2.1.3 Functional designs, breakdowns and the imperative to design*

Designs are the means by which we gain control of and improve the environment and ourselves – sometimes with massive implications. Although that does not mean we are fully aware and fully responsible for their implications. They may as such be designed in functional, instrumental terms, around obviously instrumental design ideas –where *instrumental* refers to a higher level predictability in the outcomes of using a design in a prescribed way. This gives us a relatively straightforward way of thinking about designs and designing.

The design is a functional system. Breakdowns in that functioning, or a failure to function as we expect and desire in the first place, might demand a re-design. Or we might change our requirements, consequently needing to re-design. There is then, in these various cases, an *imperative* to design. I will argue shortly that this is not the whole story, but to begin with, the idea does some useful work in some instances.

Thinking back to the assemblage theory, a designed assemblage is a kind of machine with an idea of its purpose as a component part. But the idea does not necessarily need to be a matter for reflective consideration by the user. Following this way of thinking about designs, they might only endure in consciousness when that functionality reaches the limits of its capabilities (in relation to our practices, projects and concepts) or breaks down, or when the design idea is based upon wrong or out-dated assumptions. There is, in the experience of limits and breakdowns, an imperative to examine design ideas

and their implementation, to challenge and perhaps to redesign.[55] This is a kind of functionality, leading to a functionalist explanation for the imperative to design.

Such functional breakdowns were described by Donald Norman in *The Psychology of Everyday Things* (1988) – a hugely influential book for designers, but also with an influence permeating much of the construction of the modern world. Norman's motivating concern was for design that *fits* better with functional requirements and cognitive processes of users.

The second edition of Norman's book underwent a small but significant transformation, being re-titled as *The Design of Everyday Things* – its real purpose coming to the fore: to campaign against bad design, conceived as designs that do not function effectively, that contain a mismatch with the design idea of which they claim to serve. The image on the cover says it all: an unusable tea-pot with its handle on the same side as its spout. *Usability* as a science, a craft and a matter of contention is born.

For many designers, psychological concepts like "affordance" (from J.J. Gibson, 1977), "constraint" (physical, semantic, cultural, logical), "enabling constraint", "mapping" and "feedback" – implicit in design methods, were first

[55] In their 2006 Harvard Business Review article Rust et al. described the responses of some customers to the development of the smart phone: "Do you have any phones that make phone calls?" Too often, in their eagerness to layer on additional functionality, developers lose sight of the product's basic function—the one thing it must do extremely well." (Rust, Viana Thompson & Hamilton, 2006) The iPhone was, for many, a functional breakdown. Apple responded by simplifying some features. Other manufacturers responded with a range of more straightforward phones optimised for people who find the iPhone fiddly and overcomplicated.

defined and systematized in a coherent methodology by Norman. These ideas may be combined into an approach to designing *instrumental* products and services that aims for straightforward functioning, without obstruction, without thought – without the jarring encounters with breakdown in the flows of habitual action. In web design, Steve Krug's book *Don't Make Me Think* (2005) is often treated with biblical reverence – although in reality, it would be better entitled *Let Me Think About the Things That Really Matter.*
Similarly, in *pedagogical design*, we might aim to:

- Avoid "extraneous cognitive load" (ECL), as defined by Sweller, Ayres and Kalyuga in their *Cognitive Load Theory* (2011) – meaning simply that activities are designed to allow students to focus mentally on only what matters for learning. This fits well with Norman's critique of bad design. Obviously we want to reduce annoyances and distractions in the classroom and in the home study environment. But the principle goes further than that when applied to the actions of the teacher, which might unknowingly add ECL in the form of bad habits and over-complicated learning designs (perhaps compensating for the teacher's lack of confidence).
- Create designs that are "constructively aligned" in which student activities and teacher feedback serves to achieve designated learning outcomes, progress towards which is assessed using appropriate metrics and methods (Biggs & Tang, 2011). Again this is a simple principle, often lost in over-complicated learning designs.

In some of the cases of design innovation that I have observed, an *imperative*

*to design* has clearly occurred. There is often a simple failure of systems to enable learners to participate in activities and to focus upon what matters in those activities. Less common are cases in which a teacher has reflected upon their learning designs, realised an issue with extraneous cognitive load or constructive alignment, and found a need to redesign – although it would be hard to say if this happens more often *under the radar*. The work of the Learning and Development Centre (LDC) at Warwick in supporting teacher-teacher observation and reflective development of teaching practice (through the Postgraduate Certificate in Academic and Professional Practice and the UK Professional Standards Framework[56]) has certainly increased this kind of activity, and is leading to fresh impetus to design.

In IT Services at Warwick we are constantly dealing with more straightforwardly instrumental issues. Our platforms are not always as flexible and inclusive as we would like. The Audio-Visual (AV) team in IT Services are especially adept at fixing such issues. Several of the cases in my first set of interviews involved the AV team inventing new arrangements of space and technology to cope with variations in the assembly of people and requirements. For example, in one case for the first time at Warwick a videoconferencing system was integrated into a seminar so as to allow a student to participate *as best possible* in the seminar. The course was a collaboration between the Warwick Medical School, the Warwick Manufacturing Group and business partners. A disability meant that the student could not easily attend the on-site class. However, it was not simply the addition of the videoconferencing system that solved the problem. The AV

[56] See: http://www2.warwick.ac.uk/services/ldc/development/pcapp/

team and the teacher (an expert in ergonomics) adapted the technology, the space and the learning design to create a *good enough* solution. There was then a co-adaptive redesigning in response to the imperative to design coming from a mismatch caused by a variation in conditions and the application of a design value – inclusivity.

### *Tabula: the evolution of a platform for teaching and learning*

There are many other similar examples. Some of them lead, eventually, to more substantial change to the platforms that they use. For example, in 2004 Chris Coe (my colleague in the Academic Technology team) responded to emerging requirements concerning online assignment submission. Whereas in the past paper submission of assignments was adequate, a set of changes in practice required a different online approach – including the growth of distance learning, changing patterns of studying (with students studying at Warwick and then submitting when away from the University), and most significantly, the use of plagiarism detection tools requiring electronic copies of assignments. Chris responded by adapting the Sitebuilder web publishing system, with assignment submission workflows crafted by hand for each department, and later, copied from templates. This led to emerging requirements around electronic return of marks and feedback, and a spiralling spread and growth of innovations.

Eventually, over ten years, this grew into Warwick's dedicated assignment workflow system, Tabula (now a technology platform in itself). As her development of the system proceeded, she uncovered many variations on the workflows used by different departments (and even different sub-sections of

departments). A process of co-adaptation took place in which small functional breakdowns led to an imperative to redesign (the platform and the workflows). From the outset, we knew that moving to electronic submission would enable wider use of plagiarism detection tools, and that in turn could impact upon academic cultures – plagiarism awareness might need to be built into student induction and skills training; and academics should consider designing assessments to discourage plagiarism (for example with more variation). This then raised questions about the *constructive alignment* of assessment design – thinking about plagiarism raises the question of whether we are really assessing what we think we are assessing (or rather just the ability to cheat well). The development of the technology platform then required the development of consultancy and training provision around the idea of "academic integrity". Interconnections also became apparent between assignment workflow and other activities – most significantly personal tutoring. This led to an expansion in the scope of the system and further co-adaptation. And all the time this was happening, with the assemblage of systems and practices becoming embedded and spreading across the University, the capability of the design and development team, the administrative functions of the University, the academic departments, and individual teachers and students, *grew* – from a simple functional breakdown to a newly engineered platform intersecting with other platforms and assemblages.

This huge series of innovations began with a few small functional breakdowns – we had no idea at the time where it would lead, there being no strong sense that Warwick University would ever care about such a platform (research

being the predominant focus at the time). It has then over time changed the institution.

The bigger picture described here is this: through the continual encounter with functional breakdowns and misalignments, and the consequent imperative to design, a designerly reflective and reflexive perspective emerged that viewed our efforts through the lens of design and designing; this led to a growing appreciation of the intersection of platforms, and the idea that the University itself may be designed as a unified platform.

This *designerly reflexivity*, preceding immanently from the dynamics of functioning, breakdown and the imperative to design, is a key product of viewing the University through the lens of the designerly world-view.

We will return to this point shortly. But for now, a further investigation of instrumentality and breakdown is needed – for there is more to it than badly designed coffee pots.

### *Carol Rutter: from teaching in cramped offices to open-space learning*

In some cases then proper functioning includes the value of adequate and fair participation. Designs are created to overcome barriers to participation. Some other cases were observed that could be described as *reducing extraneous cognitive load*. This is especially true of the design of learning spaces. In an interview with Carol Rutter (who was at the time the Director of the CAPITAL Centre), the long-serving professor of English Literature told me about her years of struggle against the design of teaching spaces in the Humanities

Building. The building had originally been designed for very small group teaching in academic offices. The design is still active today. An academic office is typically 2.5 metres by 4 metres, with a desk at one end. Since its construction in the early 70s, desk-space has been consumed by the computer – many academics now have a desktop computer provided by the University (running official University systems) and their own laptop (running a different operating system). There are shelves full of books running along each side of the room – serving three functions: as research material, as a visual statement, and as a means of softening the sound characteristics of the room. In addition to this, there are two rows of very low, softly furnished chairs (in a distinctive 1970s style) running along each side. This is where the students sit – or rather collapse into, as they enter the room, being careful not to knock themselves out on the low shelves. Knowing Carol Rutter, I find it hard to imagine her teaching in such a space.

Carol is a founding member of the team behind the Open-space Learning project. She teaches Shakespeare using the “without chairs” method in the CAPITAL Rehearsal Room (the white theatrical space). I have observed this many times, and have even joined in. The practice has spread to other disciplines – most effectively through Carol’s co-design and teaching of the Shakespeare and the Law module with Paul Raffield of the Law School. In 2011 I interviewed a small selection of Carol’s students (some from Shakespeare and the Law and some from the English Department core Shakespeare module). The English Department Shakespeare students are given a choice of three modes of study: conventional seminar-lecture based, Carol’s without chairs version, and a blended compromise version. I

interviewed some students from each. All of the students talked about their reasons for choosing the different options. It was clear that Carol's approach is well known for the *much higher level of commitment, focus and physical energy required*. The Shakespeare and the Law students agreed with this description.

*Without chairs* requires much more from the students, being active and engaged for two intense hours. There is, as one student told me, no hiding place. And Carol's pedagogy ensures that every student contributes, as equally as possible. It is tough pedagogic love. And requires spaces that enable movement (acting through the texts) and concentration. There is then the aim of "reducing extraneous cognitive load" in Carol's choice of spaces. She told me that for many years she had to just cope with whatever was available, and it was a painful process of just fitting around inappropriate designs. And then the CAPITAL Centre came along. After a short time she became Director (with the founding Director having had to take leave). CAPITAL had been founded as a collaboration between Warwick and the Royal Shakespeare Company, but with (she says) unclear objectives. Carol jumped at the opportunity to adapt the idea and the project funding to meet the needs of teaching at Warwick – not just to fix the functional breakdown in Shakespeare teaching, but also as an opportunity to overcome the habitual ineffectiveness of the lecture-seminar approach to teaching, and especially the limitations of teaching in the academic office.

The Open-space Learning project that evolved out of this foundational work went further still in redefining the challenge as equivalent to (although not

ever stated as) a matter of *constructive alignment* – the argument goes approximately like this, with the three aspects (objectives, activities and assessment) all being out of alignment with the subject matter of the discipline, and consequently becoming underdeveloped:

1. Learning outcomes are specified as superficial measures limited by assessment practices and constraints on what can be expected in learning activity design (lecture-seminar-essay). Instead of aiming for substantial and enduring change in the lives and capabilities of students, we aim for an accumulation of unconnected points scored on a tally sheet.
2. Learning activities are most easily designed to give coverage, to tick off a list of curriculum contents.
3. Assessment is more of a measure of the student's ability to sit in a room for three hours and write, to remember stock answers and impressive sounding quotations, and to respond formulaically to easy-to-mark tasks.

For Carol Rutter (and many others) this is simply not fit for the purpose of facilitating students in becoming the kinds of sophisticated, creative, critical intelligences and bodies that her discipline aims to create. Neither is it adequate to the task of creating a society in which people with such characteristics and capabilities *participate* effectively to make a positive contribution.

Again we can see how the experience of breakdown and misalignment in the

inherited functional designs for learning, in the platform and the range of assemblages that may be produced, created an imperative to design. That then can lead, in exceptional circumstances and with the right kind of thinking and acting, to more significant redesign – in the case of CAPITAL and Open-space Learning, and the work of the Reinvention Centre with which it is allied, this has led to an increasingly significant re-engineering of the University as a platform.

The nature of the reflexivity and agency behind these movements will be considered further shortly (in Chapter 2.2 on Designing). In this present chapter, considering the nature of *a* design as an assemblage from platforms, a further argument is necessary. These emergent *desires* are an essential part of the *design ideas* that make design assemblages what they are. They animate and form the design and, as transmitted to the user of the design, make sense of its interfaces and features. For example, learning spaces are encoded with statements as to what learning is about and how it works. These statements might be tacit, as part of the “hidden curriculum” described in critical pedagogy, or they might be explicitly stated as with the innovative teaching spaces at Warwick (the Teaching Grid at Warwick has inspiring Student as Producer slogans engraved into its frosted glass walls). Often, where a redesign is the product of a the kind of long hard struggle described by Carol Rutter, the design idea and its motivating values are more explicitly and enduringly inscribed, along with echoes of its design history (although most often this background is not recorded).

In the hands of the right kind of design innovator, persistent and serious

misalignments of design and deeply held values can result in significant design work and platform re-engineering.

If Open-space Learning and Student as Producer can be read as more successful cases of such design innovation, the history of online learning is, I argue, a less clearly positive story. But it does illustrate a different kind of experience leading to the imperative to design.

### *Breakdowns in the face of new technologies*

When making the move from synchronous face-to-face teaching to asynchronous online distance learning, the functional aspects of teaching and learning become even more apparent. There is, I argue, not yet a smooth continuum between online and face-to-face (the term I use for non-tech mediated teaching in the same physical location). The two formats represent separate and not well-connected platforms. These incongruities are now leading to an imperative to design, and more importantly, to the idea of the University as a consistent and interconnected platform. But much pain has been felt on the way as a result of a failure to see the differences from a designerly perspective.

What is the difference? The online asynchronous format, in which learning is spread-out over longer periods of time, allows for more measured reflection on the construction of learning activities. The digital format allows us to control the flow of interactions with more distinct activities, stage gates and pathways. The design of learning is made more visible to the teacher, the learner, the e-learning develop and to the quality controller. E-learning

therefore lends itself to a very different approach, with different roles, relationships, skills and design principles. The title of Jon Dron's book says it all: *Control and Constraint in E-learning: Choosing When to Choose* (Dron, 2007). Dron presents a sophisticated model of learning, based upon an elaboration of Michael Moore's *transactional distance* theory. He summarises the theory as being concerned with:

> "…the relationship between three variables in distance learning: structure and dialogue (concerning the relationship between teacher and learner) and autonomy (an attribute of the learner)." (Dron, 2007: p.19)

The aim seems to be to make these relationships measurable and controllable, bringing a degree of science and engineering to the evaluation and design of e-learning. We might, for example, use Moore's theory within a Biggsian *constructive alignment* framework to see how activities perform in taking students from well-defined learning objectives to matching assessment activities. Dron reports on the work of Saba and Shearer (1994) who, following Moore, discovered a principle that might even be a law:

> "…the more the teacher controlled the sequence of events, the less dialogic interaction occurred and vice versa…If a teacher is completely in control, then there is no opportunity for dialogue at all. If there is a lot of dialogue, then the sequence of events cannot be controlled." (*ibid*. p.20)

This gives us some basic tools for measuring the shape of learning activities, but not necessarily their value – that being a matter for empirical investigation: which shapes work best in a specific context?; what can be done to optimise the functioning of such learning designs? Dron's own work then develops Moore's theory into a more detailed *theory of transactional control* – "…that part of transactional distance that defines its dynamics…" (*ibid.* p.28), adding conceptual-empirical tools from systems theory to enable more granular descriptions of what goes on inside of learning activities – how the design of control systems encoded into e-learning systems and learning designs might produce more sophisticated arrangements of the three aspects (structure, dialogue and autonomy). E-learning systems lend themselves well to this kind of very careful engineering. Dron adds two key dimensions to the structure-dialogue-autonomy mix: choice and time (*ibid.* p.28). In online distance learning, student agency - in the form of making choices and in the form of their control over when things happen – is greater than in the live situation. Conversely, the online medium allows the teacher to structure the choices and sequences of choices available to the student. And that is part of its attraction. E-learning promises to be more *controllable*. Whereas in face-to-face settings dialogue is the conventional means for passing control to students (or students leveraging control from the teacher). In e-learning, Dron argues, students have access to choice and the management of time as a means to exercise control. E-learning design is then more concerned with transactional systems of choice, pathways, judgements concerning the value of activities. It offers a kind of freedom to the student (no longer trapped in the seminar and the lecture) and greater power to the learning designer. This is not to say that similar mechanisms can be active in face-to-face teaching, it is

just that they are more easily encoded into online mediums.

I have found Jon Dron's work, and the cybernetic systems theories from which it is derived, to be valuable in understanding the design ideas around which online learning and online learning platforms are constructed. It has also helped in understanding the nature of non-online teaching and learning, in contrast to online forms. In my research I came across very few examples that really span the two approaches (the work of Peter Corvi and Michael Eardley in the Warwick Business School is a notable exception, detailed further in 2.1.6 below). Warwick is still very much a campus-centric institution. It has a great campus, full of life, as described in Part One. There has been very little imperative to move online. This might also explain the difficulties that I have had in applying many pedagogic theories and methods to what I have observed at Warwick. For example, Diana Laurillard's book *Teaching as Design Science: Building Pedagogical Patterns for Learning and Teaching* (2013) sounds as if it should fit well with my research. It promises a design-scientific approach to describing and improving the functioning of learning designs through the medium of abstract design patterns (more on patterns and their limitations below in 2.5.1). Laurillard elaborates on her earlier "conversational framework" for learning design with an attempt to create a formal diagrammatic pattern language that can be used to describe, analyse, compare and share all kinds of learning designs – but especially designs that include managed dialogical interactions. Laurillard seems to be aiming to tame the dialogical format so as to make it subject to the same representational and cybernetic systems that are available in online learning. Jon Dron highlights how Laurillard's work developed out of a critique of

"Socratic dialogue", a critique of the naturalistic assumption that academic talk is pedagogically-sound talk *without the need for further reflection and design* (Dron, 2007: p.107). Dron wrote that:

> "Laurillard (1993) takes a different view, noting that a closer examination of Socratic dialogues reveals a process of bullying and cajoling, during which the learner is belittled and diminished in the process." (*ibid*. p.107)

Dron follows this up with the famous section from Plato's Meno in which the slave boy is bullied and cajoled into *recognizing* the undeniable truth. Dron describes this as an "anomaly", but the implication is that unexamined academic dialogue may not be an effective medium for learning – especially when contrasted with online learning. He then goes on to describe the second of Laurillard's anomalies: the lecture. Citing Laurillard again:

> "It has been argued that the traditional lecture is a terrible way to enable learning." (*ibid.* p.112)

And again the comparison with distance online learning:

> "Depending on the tasks performed in the intervening gaps between lectures, the level of guidance provided to the learner may be lower that that given in a distance learning programme." (*ibid.* p.112)

These criticisms of traditional modes of teaching and learning might be

welcomed – so long as they are based upon a fair review of the diversity of designs that might at first glance appear to be old-fashioned-chalk-and-talk. If one is coming from the perspective of online learning we might be tempted to reduce the diversity and sophistication of other modes to a stereotype – especially in comparison to the very much more *accountable* structures possible in the digital medium. A platform in which all student and teacher actions and interactions leave a digital trace might seem to be a more *designed* system, more readily improved.

Online learning is in this way a very different kind of platform. Transactional control operates differently. We might argue that it is more mechanistic, more directly instrumental. It does not need to be, but it can work in that way more easily than the face-to-face medium. Even with the best available synchronous channels (as of 2014, high definition high bandwidth communications between telepresence suites) in online distance learning we cannot fall-back on the familiar everyday medium of dialogue to make progress in an *ad hoc* fashion – literally playing it by ear (something that most academics are good at). The assemblages that are crafted out of the affordances and constraints are quite different to those encountered in most University classrooms. For example, in a *virtual learning environment* we are able to continually represent key pedagogic objects as personalised and dynamically updated for the individual: learning pathways, objectives, progress, assessment schemes, monitoring points, choice architectures etc. These visual representations may be *constructively aligned* with aspects of the user interface and collections of resources and options presented to the student (extending the idea first established by John Biggs – see Biggs and

Tang, 2011).

This is confirmed by my own observations of designs and designing at Warwick. It is still the case that almost all of the learning design work done by the vast majority of academics (observed and interviewed) is not at all like the control systems described by Dron. Even in almost all of the cases of the design-intensive innovations described in this thesis, the designing is of a different, less mechanistic, form – and the following chapters delve further into design concepts more appropriate to such cases.

I have observed that moving to the digital online medium seems to introduce a strong imperative to design – beyond the task of simply translating face-to-face teaching to the new medium. Or, as is often the case, an already present imperative to design is channelled into constructing in the digital online medium. And perhaps often, the chicken and the egg emerge together. The design of departmental web sites is a classic example. The navigational structure of a web site can be constructed to represent organisational structures of many kinds, including academic territorialities and goals that intend to reorganise territorialities. One seemingly common phenomena observed is the tendency for people to *make sense* of their own organisations by designing web site structures. And sometimes this extends to actively seeking to change the structure of an organisation (and one's own position and power within it) by changing the web site. One of my colleagues in IT Services reported a meeting in which conflict overtook the discussion, with one person demanding "more web pages" because she had "more people to manage" – where design thinking might argue that someone with more

people to manage might be better off with a simpler and elegant web design.

The term “breakdown” then takes on a double meaning:

- there is both a breakdown in the functional systems to which teachers and learners have become habituated – between the live platform in which we can fall back on a more dialogical approach and the online system that tends towards a cybernetic system;
- the transition can in some cases be extremely stressful, fuelling conflict and emotional distress (I have seen this, but obviously cannot identify the people involved).

### *Platform wars: distance learning and MOOCs*

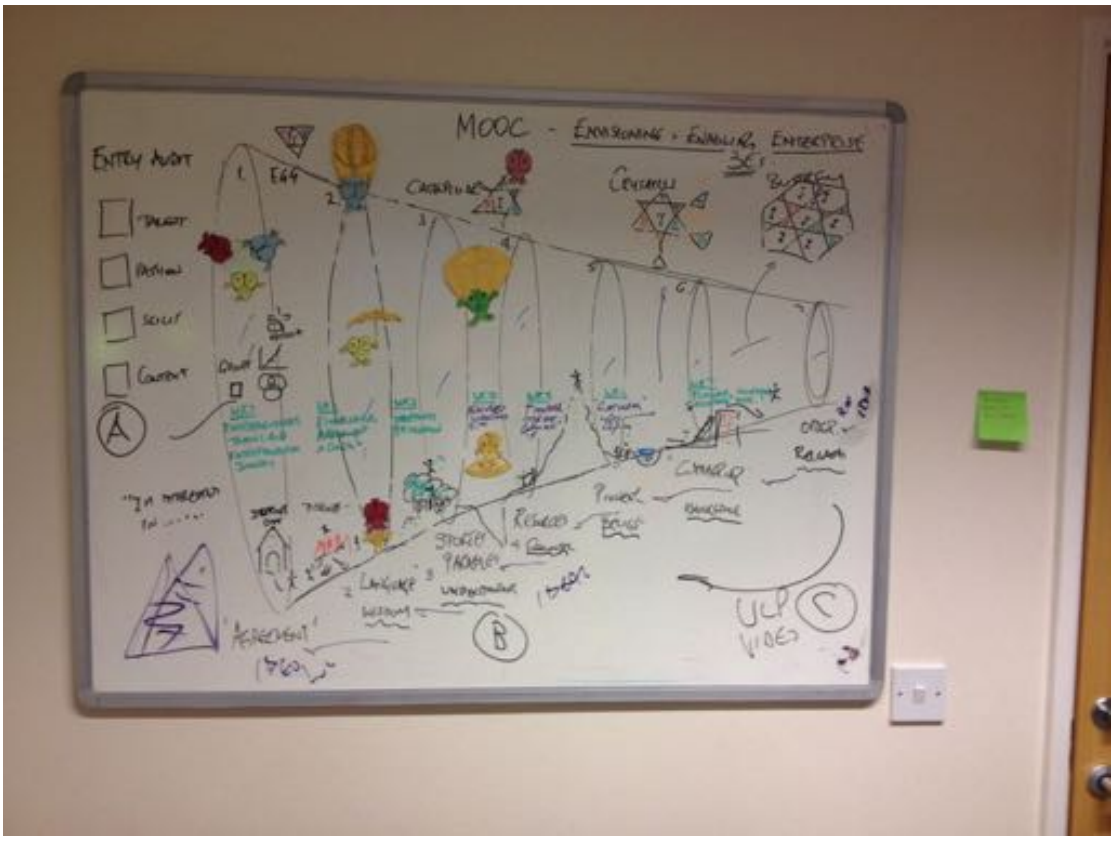
When working at the University of Oxford in the early days of online learning (1999-2001) I first witnessed the difficulties that could ensue. The Technology Assisted Lifelong Learning (TALL) team within the Department for Continuing Education (CONTED) was setup by Jonathan Darby and CONTED so as to become a market leader in online distance learning. We pushed ahead with the production of courses before adequate technologies, pedagogic theory and production processes were widely available. The attitude was entrepreneurial first, academic second (but no less important). And we learned from our mistakes – one of the most important of which was that well-established academics, habituated to the dialogical forms of face-to-face teaching, would struggle to make the transition to the technological world as described by Jon Dron. The transition was painful. We had at first expected to be simply translating successful face-to-face courses into the new medium.

This was naïve. Instead we had to create an entirely new production process (modelled on film studio approaches). And the academics had to adapt by adopting different roles and approaches, becoming more like a combination of story developers, quality assurance and (the then new role of) e-moderators. They would then fit-into the new kind of academic production process better. One of the academics, Sarah Richardson, is (since before TALL) an academic in the History Department at Warwick. Sarah has over the years used her experiences at TALL to try to smoothly adapt the workings of the History Department at Warwick to the new realities of flexible student-oriented teaching and learning. Sarah has continually introduced new ideas, including a proposed Online MA (in 2006, rejected by a then more conservative department).

My interviews with Sarah, and work with her over the years, illustrates how she comes to teaching and learning with already well developed designerly capabilities and attitudes. And furthermore, they have grown in response to the challenges involved in trying to effectively connect the contrasting platforms (conventional and online) into a cohesive platform, and the resistances that she has encountered. Other academics have had different, less positive experiences. Over the last two years the concept of the Massive Open Online Course (MOOC) has taken possession of the already well established idea of online distance learning. A MOOC is an online course but, as the name suggests, with a very large number of students. There is no clear specification as to how large a course needs to be to qualify as a MOOC, but it is common for MOOCs to be too large for each student to receive the level of small group and individual tutoring normally expected in higher education.

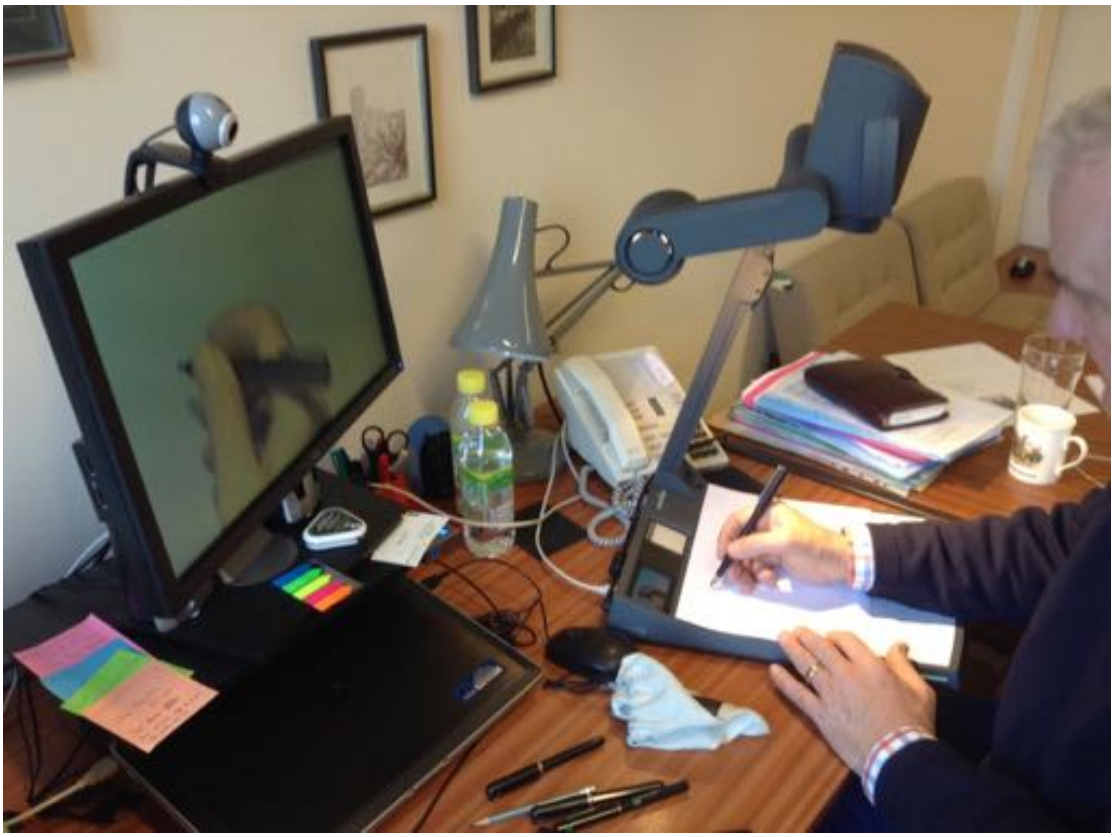
Given that almost all MOOCs are free of charge (often assumed to be another defining aspect), then personal engagement with and feedback from a tutor is not considered to be part of the deal. I explored some of these issues in my working paper on “Pedagogical strategies and technologies for peer assessment in Massively Open Online Courses” (O’Toole, 2013). I found no clearly defined and widely applied design pattern for peer assessment, despite there being an assumption that this approach should fill the void left by the lack of tutor to student individual feedback. In fact, the range of design strategies seemed to be quite slim, despite what might be afforded by the online medium (as detailed by Dron). Most MOOCs seemed to be pedagogically-slim: combinations of downloadable texts (although due to copyright limitations, the range is limited), videos and multiple-choice tests. Warwick provides content for the Futurelearn MOOC *platform*. In 2014 academics were being encouraged to create courses for Futurelearn, and in some cases were ‘commissioned’ more directly following the assumption that existing courses could be converted to the MOOC format. Upon hearing about this I recalled my experiences with the TALL team at Oxford. There would, I could guess, be translational difficulties and fresh imperatives to design.

To investigate this further, I spent time with a teaching fellow from the Warwick Business School (WBS), Nigel Sykes. I observed Nigel working in his office. It was for me, as a student of design thinking, a remarkable process to observe. Nigel is very much a visual thinker. He builds and tells stories through the medium of sketches. This sketch was pinned to his office wall:



*A design for a MOOC, by Nigel Sykes (WBS)*

Nigel *animatedly* talked-through the idea behind the MOOC that he was working on, based upon his “egg to butterfly” model of business development, as documented in “Envisioning, enabling and enacting: metamorphosing the enterprise” (2008). This, as it became clear, is a fascinating topic, full of stories and insights. Nigel is able to draw upon his wealth of experience in business, combined with his highly reflective approach to teaching, to make a complex topic understandable and interesting. Central to this is his ability to sketch and talk through ideas – rather like a designer. To capture this on camera, the innovators from Audio Visual services had adapted a document visualiser, a microphone and screen recording software:



*Nigel Sykes sketching, talking and being recorded.*

As I later discovered[57], the Futurelearn MOOC platform is especially oriented towards storytelling approaches to teaching. The CEO of Futurelearn, Simon Nelson has a background in broadcasting (BBC), and believes in the importance of "high quality video-story-based short courses". Nigel's visual storytelling style might fit well with this. However, he is also a capable and sophisticated designer of highly dialogical and interactive learning activities. He described some of the designs used in his on-site courses, including structured simulations in which students experience business development and its dilemmas from the inside. The mismatch between his expectations of how learning should work and what might be possible in the MOOC platform became obvious. In response we started to get imaginative, but perhaps within such a restrictive platform, limitations will be too great. The imperative

[57] From a talk by the Futurelearn CEO at the British Universities Film & Video Council annual meeting, 28th November 2014.

to design had been generated by the functional incompatibilities, but with no easy route to adoption and adaptation in the platform.

**As my research progressed, the complexity of many learning designs and platform designs became clear. However, to describe them as functional-instrumental systems, or as straightforward responses to breakdowns in functioning, over-simplifies their nature. And this is where the danger lies with viewing "traditional" modes through the lens of online learning – and the reason why we need to take a more comprehensively *designerly* view.**

Conventional modes of teaching and learning are complex assemblages of matters, ideas, people, cultures – in fact each of these terms represents an abstraction from the mixed-up world of assemblages. Another way to look at the complexity of things is to consider how they came to be the way they are, and how that history of design decisions *and* emergent unplanned outcomes creates assemblages around which practices, cultures, ideas, people form, and from which they might not easily escape. Admittedly, this is not an easy idea! It concerns the formation of organic forms constituted from distinct things (or platforms) with internal bonds made strong by the empowerment provided by the transversal interconnections. In this way accidental assemblages can endure against all kinds of external pressures. Instrumentalities embedded within such a system may be hard to understand from outside, but also hard to displace. We need an example. Of all of my observations of teaching and learning at Warwick, the mathematician's blackboard is the example that illustrates this phenomena most clearly.

### *Mathematicians and their blackboards*

The blackboard is what, I think, Dron would call a dialogical pedagogy. And it is exactly the kind of pedagogy that resists reproduction as systems of control and choice in an online platform. At Warwick it sits within a wider set of designs, including an entire building (the Zeeman Building[58]), constructed around it. Or more accurately, the building is constructed around the practice of mathematicians working together at blackboards as a kind of interface between minds and numbers. It provides a simple, reliable, kinaesthetically familiar register for the creative struggle with the vast possibilities and constraints immanent to numbers.

In 2011 I interviewed the mathematician David Mond about his teaching practice. David was a winner of the Warwick Award for Teaching Excellence, so I assumed that like many other WATE winners he had some exciting innovation to tell me about. To begin with, however, he made it clear that he does not think of himself as an innovator. He had helped to develop important aspects of maths teaching at Warwick, and regarded his WATE as being largely due to his work in establishing peer support activities for maths teachers. He framed his teaching success firmly within the traditions of practice and excellence of his department (a world-leader). It was clear that he was representing a discipline, and a local version of that discipline, with a strong sense of there being *essential design characteristics* – and complementing that, an equally strong sense of what does not fit (for example PowerPoint). In my notes on that meeting I wrote that:

[58] Named after the Warwick mathematician Christopher Zeeman.

> Most mathematicians agree on this, it is much better to work through the maths live and in person on a **blackboard**, rather than mechanically stepping through a series of slides. Mathematicians want to recreate the live process of discovery and exploration. This is a physical and mental process, body language and kinaesthetics are important, expressing the flow and physical effort, the concentration and effort. Even the type of chalk used makes a difference – the feeling of it matters, something not present with whiteboard pens. And it must be uninterrupted – pick up a piece of chalk and go, without worrying about the ink running out. There is an enjoyment in the sometimes strenuous effort, and sharing this aesthetic is an important part of teaching. Maths teachers want to draw their students into this, to get their sympathetic neuronal mirroring to engage to achieve deeper learning. The uncertainty of the unfolding work is an important part of this, a slideshow leaves no room for improvisation.

There is in this a clear sense of what contributes to the cognitive effort and what might add distraction and disruption – or in psychological terms, extraneous cognitive load. My notes continue:

> The design of spaces in the department is based upon these ideas. Supervisions take place in the open, using bright, airy, comfortable open spaces, each with the necessary blackboard and chalk. The spaces are bookable, and used informally by students for their own collaborative work This design was introduced by Professor Sir

> Christopher Zeeman (after whom the new building is named), and represents one of the most effective implementations of open-space learning at Warwick.

From the perspective of the mathematicians, this is an entirely obvious and natural expression of design values and matters that are *immanent* to doing maths. The effects are subtle, perhaps only clearly knowable to the mathematician, but it is a functional design, an essential instrument of experience and agency for the mathematician – to be preserved and defended from breakdown.

The full significance of this became more apparent in a meeting to discuss design ideas for the proposed Teaching and Learning Building. We had convened in the Students' Union, with an interesting collection of students, SU representatives, administrators and academics. I gave a presentation that aimed to show a wide range of possible *flexible learning designs* and how space and technology might combine to enable them in the new building. This was received well, but the post presentation discussion turned around to the question of the blackboard. David Wood (a senior teaching fellow and well respected maths teacher) argued that *if the building were to be genuinely multidisciplinary, it would have to include real blackboards*. No one could disagree, even though it would cause difficulties for the computer and audio visual equipment (chalk dust, although David Wood suggested that higher quality chalk would help). This then sparked much design thinking in the session and beyond.

My presentation for the meeting in the SU, entitled “The Extended Classroom” would eventually transform into a project and a new approach to technology enhanced learning. An essential aspect of this new approach is a set of *design values* that start from the essential characteristics of the discipline-focused interaction between students and teachers, aim to *sustain* and *amplify*, but at every point aim to ensure that solutions are fast, accessible, unobtrusive, reliable, sustainable, supportable, transferable, enduring, recognisable and collective-capability boosting. The lesson learned is that functional design matters, fitting with essential instrumentality and avoiding unnecessary breakdowns and intrusions in flow – but that such breakdowns can prompt reflective appreciation of platforms, assemblages, patterns, design ideas and values *if handled with care.*

In chapter 1.6 I described how my research transitioned from a patterns-oriented empirical survey to a more sophisticated, but difficult, design anthropology. It was then, as described in this chapter, a necessary result of a closer encounter with the real nature of platforms, designed assemblages and designers in the University – the realization that to do justice to the objects of my study, I *must* handle it with the care that comes with the more attentive feel for matters and their assembly that comes with the *designerly world-view.*

I simply could not reduce what I was seeing and hearing to more straightforwardly functional terms of simple design patterns. Although that is not to say that design patterns are not useful tools in the development and equal distribution of design capabilities. However, the more immediate task is

to explore the fine detail of real designing in the University in more detail, and that requires the introduction of further concepts to understand the nature of *a* design.

### *2.1.4 Design affects – beyond functionalism*

A designed assemblage might be analysed in mechanistic terms, or as systems of flow, thresholds, feedback, control and transition (a systems theory kind of mechanism). But there are many other richer and more subtle aspects – some of which are intended by the designer and programmed into the designed thing, and others of which emerge with the design in the wild. These *affects* are amongst the detailed subject matter of the designing observed for this research project.

The mathematics blackboard, as a technology, a location and a practice, is full of significant *affectations* (not meaning that in a superficial sense). The open spaces in which mathematics tutorials take place distribute and concentrate affects in yet more significant ways – the grouping of informal chairs around the formal space is deliberate.

Every design produces multiple affects – intentionally, as conceived by a designer, and unintentionally, as it interacts with its environment and gets adapted and modified. It is important to be aware that not all designs are of a simplistically *functional* type - where a chain of actions and interactions deterministically produces a well defined result. Designs can have a range of outcomes or *affects* that are not straightforwardly deterministic. An arrangement of matters in a design will tend to affect certain other things (such as people) in certain situations, through patterns of agency that are not necessarily perceived, but when analysed have distinct affects – for example, inducing a mood amongst people in a space.

Beyond the everyday use of the term, Deleuze and Guattari use a concept of *affect* within their transcendental materialist philosophy – and my thinking is derived in part from that concept. In his introduction to *A Thousand Plateaus*, Brian Massumi defines *affect* as "..a pre-personal intensity corresponding to the passage from one experiential state of the body to another and implying an augmentation or diminution in that body's capacity to act." (Deleuze & Guattari, 1980/1987: p.xvi)

My use of the term however is not so broad, not so abstract. Assemblages, designed or otherwise, tend to elicit repeated and consistent (but not necessarily deterministic) affects of recognisable types. When reflecting upon a design, designers describe these affects as part of their theoretical thinking about what the design should or could do *in action*. And they have a *repertoire of terms* to use as the content for this design theoretical knowledge, as well as a *repertoire of methods* for encoding these theories into the designed things.

Designs and design thinking in the University can be understood in part by looking at the repertoires used by designers in explaining their designs. As will be seen, teaching and learning *should be* especially rich in theoretical and practical knowledge concerning design affects – the complexities of gathering a diverse group of minds and bodies together to focus upon some common topic and to undergo some common transformation seems to demand a repertoire of affects that is more sophisticated than most other forms of designing. Innovative thinking in higher education teaching has often been concerned with broadening the repertoire. For example, in her book *Now You*

*See It* (2011), Cathy Davidson calls for a more realistic view of how learners manage their attention *and* distraction. She draws from neuroscience, from the reflections of successful people from a wide range of disciplines and from her own observations as a university teacher. Davidson's book illustrates how everyday learners draw upon a wider repertoire of techniques for managing their mental efforts, and that this often translates into what we would recognise (using the definition above) as designs for learning – although not often matched with designs for teaching. Similarly, the *Open-space Learning in Real World Contexts* project at Warwick (of which I was a member) sought to widen the repertoires of teachers and learners, with a greater awareness of the roles of physical activity and movement in the productive configuration of design affects for learning (see Monk *et al.* 2011).

My own understanding of *affects* has emerged from a synthesis of these ideas, the assemblage theory, design research, and my own work as a designer. Out of this, my own repertoire of design affects has grown into what might be called a *language of affects* (which feeds into what I will later describe as a pattern language). These terms/concepts can form the basis of designing, and the critical-creative reflexive dialogue of the designer. The language is extensive and always evolving, but some ideas recur. So as to give a sense of this, here is a short sample of the kinds of terms that I use and (I have found in my studies) are used by *some* designers in higher education. The ways in which we might implement designs for these affects varies greatly, and could be said to be the main focus for the challenge of designing. But the terms themselves might give us a common language around which we can tame design challenges through the application (and

sharing) of design knowledge.

- *constitutive* - where the design creates a common ground within which collaboration occurs;
- *affording* – providing opportunities for a range of interactions with the design and its system;
- *enabling* – the design allows an agent to formulate and undertake actions to satisfy desires and goals;
- *constraining* – the design prevents an action, a set or sequence of actions;
- *enabling constraint* – the constraints guide the user in selecting an action, set or sequence of actions;[59]
- *reflexive* - we are encouraged to think about our own position and actions;
- *enframing* - where we are drawn to see things from a particular perspective;
- *funnelling* – progressively reducing the diversity in a state of affairs down to some common direction and concentration;
- *generative* - where the design defines a constrained pattern as a starting point which then acts as springboard for creativity;
- *aesthetic* - where the design sets a mood in which actions may take place;
- *holistic* - we stand back from and see things as a joined-up whole;

[59] The concepts of affordance, enablement, constraint and enabling constraint were translated into design theory from psychology and systems theory by Donald Norman (1988).

- *empowering* - channelling and distributing the capability to make changes and effects;
- *disruptive* - the design causes a breakdown in the prevailing conditions;
- *sustaining* - the design prolongs some aspects of the current conditions.

When observing a good teacher, or a well-functioning student collaboration at work, we can clearly observe affects being managed – often effortlessly. The consideration of what affects are appropriate when, and how to set them up and sustain their power so as to promote learning, is the subject matter of *pedagogy*. This might be focussed at the granular scale of what happens in short sections of a learning event (such as a workshop), or it might concern a bigger picture.

### *What, why democracy? with Renske Doorenspleet*

For example, when working with Renske Doorenspleet of Politics and International Studies on her innovative Core Issues in Comparative Politics module I could see the module being structured over two terms with different affects coming to the fore at different times, shaping the module as a dynamic of forces including concentration, disruption, opening-out and funnelling towards an increasingly definite point. The students on the module had to conceive and produce short films in small groups, on the topic of "what, why democracy?". In the term following the module, the films were presented at a festival (with feedback from the documentary maker Zoe d'Amaro). This was accompanied by a student-led conference on democracy. It was a challenging

and complicated undertaking. But by carefully channelling, empowering, constraining, disrupting and comforting the groups, they made it through successfully, and more importantly, had time to reflect and learn from the experience. Most importantly, Renske would pause to enframe the diverse experiences and challenges for the students, so as to keep it making sense and to challenge negative sentiments. By wrapping the project of the module with a conference and the screening, she constructed an ever present horizon towards which the students travelled. We ran debriefing sessions with the students after the module had been completed. It was clear that the design had achieved its aims. The students had a deeper connection with the subject matter. But also their perceptions of where studying politics might lead had been widened significantly. It had been challenging, but the careful management of affects had ensured a collective passage through and out the other side, giving a heightened sense of solidarity in the experience, as film-makers, researchers and as activists.

### *2.1.5 Interaction designs and experience architectures*

Designs then are often complex assemblages that combine deterministic and less-deterministic affects. They are interactive and experiential.

The concept of *interaction design* is closely associated with the designers Bill Moggridge (founding member of IDEO) and Bill Verplank (Xerox Palo Alto Research Centre, IDEO). In the 1980s, the US technology industry encountered a fresh imperative to design, and to push the limits of design thinking. Developments in computer hardware and low-level programming were starting to out-strip both the capabilities of human users and of designers to produce interfaces between humans and computers. The science (and craft) of *human computer interaction* (HCI) was born. This has largely concerned itself with software design, and more recently, web design. However, more visionary designers have extended this line of thinking to view the environment as a system which may be designed with human-system and system-mediated human-human interactions in mind, mediated by technologies, and made simpler, more efficient, more powerful with the application of insights from psychology - J.J. Gibson, Donald Norman, and more recently the *behavioural economics* of Kahneman (2011) and Thaler & Sunstein's *Nudge* (2008).

Interaction Design is a discipline, a profession, a body of knowledge, but also a craft. It is concerned with designing behaviours and the systems that support those behaviours. Following Norman, a device or system may be analysed to assess its compatibility with the desires, mental models and expectations of its users. Users are observed interacting with devices and

systems, using tools adopted/adapted from psychological research. For example, the Web Team at Warwick University uses eye-tracking devices to test the usability of web interface designs.

As the nascent Interaction Design grew in capability and scope, some designers began to apply it more broadly – literally out-of-the-box (where the box is the desktop PC) and into more complex social situations and ecosystems. Moggridge designed the first laptop computer in 1982, liberating Interaction Design from the desk and the office. At the same time, the designers at Xerox were working on an even more radical idea.

Few people know that the iPad concept was invented in the mid 80s by a collaboration of anthropologists, designers and computer scientists at the Xerox PARC. The ParcPad was just one component in a much more revolutionary vision: ubiquitous computing. Mark Weiser, Rich Gold and John Seely Brown later described how they were motivated by "…the idea of spreading computers ubiquitously, but invisibly, throughout the environment." (Weiser, Gold & Brown, 1999: p.693). They wrote that:

> "We wanted to put computing back in its place, to reposition it back into the environmental background, to concentrate on *human-to--human* interfaces, and less on *human-to-computer* ones." (*ibid.* p.694)

Anthropologists, observing designs in practice, were central to this paradigm shift:

> "…the anthropologists of the Work Practices and Technology area within PARC, led by Lucy Suchman, were observing the way people really used technology, not just the way they claimed to use

technology.” (*ibid.* p.693)

The PARC collaborators built the first ubiquitous computing environment, complete with wireless networking, cloud computing and a full range of mobile computing devices with various form factors and specialisations.

Many of the now familiar elements were in place in these early prototypes. The participants were working together on shared documents, using devices that allow sharing and collaboration through the network *and* through physical space seamlessly. They can pass around files or devices. Analogue sources could easily be digitised and added to the mix with digital resources. Participants could work synchronously or asynchronously, in any-place and at anytime, carrying their connected devices with them.

It quickly became clear to the Xerox team that they were doing more than just inventing cool gadgets. They had started a revolution that would lead to new ways of working and learning.

> "…we came to realize that we were, in fact, actually *redefining* the entire relationship of humans, work, and technology for the post-PC era." (*ibid.* p.694)

But at the same time, they had introduced (or made more explicit) additional dimensions to the design challenge, introducing many more areas of variation in environment, behaviour, cognition and emotion, including: social factors (freed from the desktop, people work together, or at least in each-other’s presence); physical factors (with far more variation in the location and arrangement of people and devices); emotional factors (when we are able to spend 24/7 with a device, it becomes more of a matter of love and hate). And

most significantly, they had initiated a shift from systems with very little configurability (by the end user) to systems that require people to choose and learn, to select from many possible options, and to combine designed elements (which may have compatibility issues) into a solution that works for their practices, projects and concerns. In the technology world then, users are becoming more like designers – being faced with design choices, and being given design agency.

The world of ubiquitous computing, along with other developments in technology and society, has shifted the role of the designer away from being the master of all interactions - although making good interaction designs matters more than ever before (as things get more complicated, clarity and simplicity is essential). A broader, more open, concept has emerged in addition to Interaction Design: *experience architecture*. This is a "bigger picture" view of designing – how humans and a designed/emergent ecosystem work together over time. Experience architectures do not specify the details of everything that will happen in the system, but rather are concerned with qualities that run across an open set of possible interactions within the designed *platform* or space. Tom Kelley (general manager, IDEO) describes how caring for this aspect of designing is recognised as a key role within design-aware companies:

> "The Experience Architect is that person relentlessly focused on creating remarkable individual experiences. This person facilitates positive encounters with your organization through products, services, digital interactions, spaces, or events. Whether an architect or a sushi chef, the Experience Architect maps out how to turn something

ordinary into something distinctive–even delightful–every chance they get." (Kelley, 2005)[60]

Kelley's text is oriented towards a corporate audience (and as such might jar with some in higher education), but it is motivated by a change in the way in which humans act, think and feel in the massively enriched and designed environments that permeate much of what we do today (including universities). And most significantly, along with the other key *designerly* roles that he identifies for the successful design-led organisation[61], it represents a paradigm shift away from earlier concepts of designing and the designer – a wider design thinking that liberates design from the studio and the brief.

Where then are the experience architects in the University? Over the last few years there has indeed been much talk of "the student experience". The invention of posts dedicated to developing this in academic departments has been a welcome innovation. At Warwick we have an increasing number of such people, as well as teaching fellows (graded all the way up to *professorial* teaching fellow) and learning technologists. This might be interpreted, to some extent, as a reactive response to heightened pressures – there certainly *seemed* to be an increase in teaching-oriented posts in the run up to the 2014 Research Evaluation Framework (REF) audit.[62] They might just represent a

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[60] The key elements of Kelley's *The Ten Faces of Innovation*, including definitions of the ten faces, are presented on a dedicated web site at http://tenfacesofinnovation.com

[61] The *Ten Faces* are three "learning personas" anthropologist, experimenter, cross-pollinator; three "organizing personas" hurdler, collaborator, director; four "building personas" experience architect, set designer, storyteller, caregiver.

[62] The Times Higher Education reported an increase in the number of academics on teaching only contracts, from 25.2% in December 2012 to 27.1% a year later. http://www.timeshighereducation.co.uk/news/ref-year-saw-more-on-teaching-only-contracts/2017619.article However, this does

strategic strengthening of the protective layer in a neo-Kantian design, with the sole purpose of deflecting attention away from the academic core. However, my interviews and observations with some of these new people suggests that they are beginning to transform the University. I argue that their effectiveness has resulted from an understanding of, and greater competence with approaches that are akin to interaction design and experience architecting – although they would not have used those terms. As I argue in Chapter 2.3, they have drawn upon design-like practices from non-academic backgrounds, and transferred them into a kind of *guerrilla designing* to transform the University. They might be on their way to establishing themselves as a new cadre of *professional designers* with shared knowledge, practices and designerly sensibilities and capabilities, recognized by the wider University as an essential part of its core.

### *Sara Hattersley, interaction designer and experience architect*

There are many examples that I could include to detail these people and their substantial impacts. However, Sara Hattersley's work in the Centre for Lifelong Learning (CLL)[63] is especially notable for three reasons: I use it as a kind of gold-standard example of pedagogically-informed interaction design and experience architecting; it combines new technologies to transform existing non-digital practices into a new departmental platform for teaching

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not include all kinds of teaching support roles, and the increase is likely to be even higher.

[63] I should also admit some minor personal influence in this specific case: I was part of CLL's recruitment process for Sara's post (E-learning Manager); Sara was influenced by a talk that I gave concerning the use of learning technologies to support students in mastering *threshold concepts* (Meyer & Land, 2013). I am also an alumnus of CLL, having been an Open Studies student between leaving school and becoming an undergraduate.

and learning *that fits perfectly with the diverse range of staff and students involved*; it contrasts starkly with the kind of learning designing that I usually see at Warwick – being far better informed by theories of learning and empirical research.

Sara comes from a teaching and teacher-training background, specializing in adult literacy (with an already successful career at CLL). She therefore began her work with a good understanding of the challenges from the student and the teacher perspective. However, one of her smart *designerly* moves was to prioritize that understanding above technical matters – a kind of *empathic design* (Leonard & Rayport, 1997) as the starting point.[64]

When Sara described some of her designs[65], small details were identified and explained as resulting from an understanding of the conditions under which the students would be working and the backgrounds of the student (mature part-time students) and the teachers. These conditions, combined with the many variations amongst the students (perhaps more varied than the usual straight-from-school undergraduate intake), created a kind of *supercomplexity* as the backdrop against which a usable and cohesive learning design would have to be produced – a design that also worked for the teachers (who were, again, a diverse group). This translated directly to interface and workflow design – architecting the student experience into what she calls the "persistent classroom", which "…ensures students endure and succeed through the technologies used." (Hattersley, "Transforming Pedagogy and

[64] More detail on the empathic approach to designing in 2.5.1
[65] To me personally over several discussions, and in a talk at the Window on Teaching event, Teaching Grid, 24/10/2014.

Experience through e-Learning in Teacher Education", 2014[66]). The design aims to exploit the potential of new technologies in a way that fits well with the needs and capabilities of the students and teachers – but at the same time seeks to grow those needs and capabilities carefully over time.

Sarah adapted the idea of *the flipped classroom* to fit her requirements. The idea of *flipping the classroom* is a simple design pattern for increasing student engagement: time that would normally be taken up with *old-fashioned-chalk-and-talk* is replaced with activities in which the students are more active; background knowledge and key ideas are taught using short online videos and e-learning activities; the students come to class better prepared to make the most out of their time with the teacher. Sarah had attended a "design thinking" workshop that I led on this pattern (6th November 2013) in which I connected it to Meyer and Land's work on *threshold concepts*. A *threshold concept* is "…a portal, opening up a new and previously inaccessible way of thinking about something…" but also a form of "troublesome knowledge" getting in the way of a student's onward progression (Meyer & Land, 2010). In my paper for my workshop I connected these two ideas, flipping the classroom and threshold concepts together.[67] Sarah then interpreted my version of the pattern into a design for specific courses in CLL to support what she calls "a shift in curriculum design thinking" (Hattersley, 2014: p.2). Sarah describes how the initial redesign of the Adult Literacy Subject Specialist (ALSS) course focussed upon threshold concepts in class – with the concept of "coherence in writing" being especially *troublesome*. In this iteration of the

[66] One of the most detailed, designerly and well-thought-through accounts of real pedagogic designing that I have come across.
[67] My talk is online at http://www.warwick.ac.uk/teachinggrid/wit/201311201554 and the subsequent working paper is at http://wrap.warwick.ac.uk/58050

design, the threshold concepts were found to be taking-up too much of the available in-class time. To address this imbalance, the class was “flipped” with screencasts being produced to allow the students to *persistently* work on their understanding of the concept at home and in their own time. Sarah reports that:

> “This made space in the classroom for synthesis of ideas with peers, and evaluation of the concept and its applicability to practice…” (Hattersley, 2014: p.3)

The implementation of the *flipped classroom* pattern then allowed for “problem-based learning” around “complex, real-life problems” with the development of “critical thinking, collaborative learning, verbal and written communication…” (Wheeler *et al.* 2005 cited in Hattersley, 2014).

However, Hattersley’s *empathic* design perspective would not let it rest there. Viewing the learning design through the architecture of the full experience reveals some potential weaknesses. Sarah knew that she had to counter the tendency of online learning to fragment the student experience across different media and channels (physical and digital). And furthermore, different students would respond in different ways – there being a mix of technology skills and expectations.

In many cases, these challenges might have just dissipated design efforts. However, three factors combined in this case to intensify the *imperative to design* – a key design value, the aim of reducing failure and drop-out to zero (coming from CLL’s ethical dimension); the designer, Sara Hattersley and her will to create a solution that would work and would establish technology

enhanced learning as an ordinary, everyday practice in CLL; a *designerly* step-backwards from the small details of the case, made by Sarah Hattersley with the introduction of *persistence* as a design value running through every aspect of the design. The eventual learning designs and curriculum designs have been created with the core aim of encouraging *learner persistence* and using that persistence to take the students on the tricky journey from "knowledge and understanding", through "application and analysis" and to "synthesis and evaluation" (*ibid.* p.4). This journey is mapped in a diagrammatic form across student activities in the two spaces "distance space" and "classroom space", and a range of complementary "tutor activities". Sarah's diagram (presented in her paper) represents the architecture in which successful learning and development experiences are constructed. In addition to the flipped classroom, other technologies and practices (such as blogging) are combined to promote persistence and to add coherence.

Sarah Hattersley's designs are, as I stated, a gold-standard level of sophistication relative to the ordinary everyday designing at Warwick. I also use her case to illustrate how we cannot easily separate design ideas, values and the designer from the designed assemblage – the design only works with these components actively creating and sustaining a community around the design. Furthermore, considering my own role in this example, and my efforts to kick-start a community of design thinkers at Warwick, the design is embedded within a platform that includes that designerly community. We might separate out components of its assemblages, for example in the form of design patterns, but the synthesis that we see in action being effective is very

much located in the platform and with the people. *Our* design ideas (being emergent from *our* design platform) are indeed spreading. For example, Christian Smith of the English Department is making similar use of a blending of live and online technologies. Christian was also present at my *flipping the classroom* design workshop. In Christian's case the challenges might be even more extreme – he teaches *modernity*, its impact on 20th Century literature and literary studies and the transverse impact of literature on the modern world. Modernity is a difficult concept. Not just a threshold concept, but perhaps a liminal concept – one that we never truly master and which continually evolves in response to our efforts to pin it down and make it work for us. Christian's solution is, in a similar vein to Sarah's, to blend physical and digital environment and workflows into an experience architecture with managed interactions and less-managed spaces for dialogue (using the Moodle VLE amongst other technologies).

These efforts and more are feeding into the broader development of experience architectures, architecturing and design capability across the institution.

### *2.1.6 Choice architectures*

Experience architects then are appearing in all kinds of interesting places, and attaining a new degree of clout within organisations – and even in some cases a celebrity status. "It's hard to overestimate the influence of Jonathan Ive" – Shane Richmond of the Daily Telegraph wrote in 2012.[68] In September 2014 I personally attended a meeting with representatives from the Blackboard company (best known for their Blackboard Virtual Learning

[68] http://www.telegraph.co.uk/technology/apple/9283706/Jonathan-Ive-interview-simplicity-isnt-simple.html

Environment). I had expected to get the familiar sales-oriented pitch for a US developed instructional platform. However, in looking at their current developments, beautifully designed HTML5 web tools of the kind that people just adopt naturally (rather than being forced to use by IT Departments and institutional managers), I sensed that something had changed in the business. Yes, the Blackboard reps told me about their new Vice President of Consumer Design Jon Kolko – author of books including *Thoughts on Interaction Design* (2011) and *Well-Designed: How to Use Empathy to Create Products People Love* (2014). This might signify a now well established belief in the corporate world, following the example of Jonny Ive, that companies can be turned around and achieve global success through the powers of designers and great design.

There is, however, a more controversial side to this. As already discussed, in *The Psychology of Everyday Things* (1988) Donald Norman explained how arrangements of affordances, constraints and enabling constraints are designed into the interfaces of designed things. These work well when they *fit* with the "mental models" of the people who use them. Theories about people's mental models are built into designs, and interpreted by users. This is fraught with problems:

> "Mental models are often constructed from fragmentary evidence, with a poor understanding of what is happening, and with a kind of naive psychology that postulates causes, mechanisms, and relationships even where there are none." (Norman, 1988: p.38)

But Norman brings to this a more advanced *cognitivist* approach. And designers have taken note. The notion that we can design interfaces intelligently, so as to guide people, to present them with clear and meaningful choices, to give a helping hand, has been part of designing for some time. However, more recently these techniques have been re-presented with a new name: the *choice architecture.*

Whereas Norman's arguments and advice on interface design originate from quite prosaic concerns (putting the handle on the right side of the coffee pot), the idea of choice architecture has been linked in *behavioural economics* to commercial practices (as a way of capturing, holding and exploiting a market) and to a kind of *liberal paternalism* in social policy.

Thaler and Sunstein's *Nudge: Improving Decisions About Health, Wealth and Happiness* has been, since 2012, a core text for politicians and civil servants struggling with problems that require behavioural change on a massive scale, but which offer no simple methods of direct control. "Nudge", as it has become known, uses insights from the study of *unconscious cognitive bias* – the field developed by Daniel Kahneman and Amos Tversky - see Kahneman's book *Thinking Fast and Slow* (2011) for an excellent account.[69] *Choice architecting* creates nudges towards patterns of behaviour that are (according to the liberal paternalist claim) better for the user, or (in from a less paternalist perspective) more profitable for the provider. Insights into cognitive biases are used either to manipulate decision making, or to avoid the

[69] Common biases include fundamental attribution error, confirmation bias, self-serving bias, belied bias, framing and hindsight bias. A good list of known biases can be found at http://en.wikipedia.org/wiki/List_of_cognitive_biases

negative consequences of bias. For example, we might design-in a strong likelihood that a user will “accidentally” discover a feature. It then has an association with *good fortune*, which can boost the user’s assessment of its value and their attachment to it. Accident then becomes a feature manipulated in the choice architecture.

In this way the designerly practice of *choice architecting* has entered many new realms and raised awareness of design and designers.

As Jon Dron’s approach demonstrates, choice architecting is easier in the online digital medium. We can even setup learning pathways that force students to make choices and act following pre-specified chains of choices. In my career as an academic technologist, I have sometimes worked on learning designs that take advantage of a control systems approach. But not as often as might be expected. There has always seemed to be a mismatch between the kind of less-directive designs that come naturally to University people and the more directive designs imagined by e-learning systems engineers. And this is not a matter of arts versus science – there might be a more systems-control oriented bias in the sciences, but I have not often observed this transferring into technology enhanced learning designs – basic skills and knowledge acquisition being the occasional exception.

In a few cases more subtle control systems are *designed-in*. And it is in these cases that *choice architecting* becomes visible. I *have* observed this happening in face-to-face teaching, when students are nudged towards a behaviour by a teacher setting out a range of options – the illusion of choice

heightening a sense of ownership over events, and perhaps then increasing the level of student commitment and engagement. But it is more clearly visible where encoded into a digital platform.

### *Peter Corvi and Michal Eardley, Warwick Business School*

The work of Peter Corvi and Michael Eardley in Warwick Business School (WBS) is one of the best examples that I have seen – another gold standard example. When I interviewed Peter and Michael about this in 2011, they had been developing this unique approach to undergraduate teaching since 2004. The approach, adapting the discussion forums system built into the MyWBS VLE, developed in close partnership with *technology integrator* Michael Eardley, and is very much a joint project. Michael is an accomplished philosopher and technologist, with an extensive knowledge of the systems theory approach. When I interviewed them together in 2014, the depth of their mutual understanding was obvious – a rare design collaboration amongst the cases that I have studied.

In 2011, Peter told me that the basic need was to encourage undergraduate students to participate more in seminars, especially the international students. The students were expecting to be "receivers" of content in seminars, not contributors or interactors. Peter had been teaching first years since 2004, and trying to address the problem. However, there seemed to be no simple problem. This can lead teachers into a kind of wicked problem – in which they spend more time trying to get students to engage than on the subject with which they need to engage. A more sophisticated strategy is required. To discover and refine such a strategy requires a designerly stepping-back and a consideration of design values. Peter decided that he was looking for ways to

"socialize" the students into the necessary approach – a way that seemed to everyone to be a natural part of the intellectual activity, rather than a bolted-on set of extra requirements. This *naturally proceeding from the academic work* can be said to be a core design value. The extra behaviour change had to seem intrinsic and not extraneous. And it had to work for non-native-English speakers.

Peter explained that: "Increasing student participation is the key aim, but somewhat concealed." – the trick lies in the careful concealment of that goal in what would appear to the students as ordinary teaching and learning practice oriented towards covering more up-to-date content. He continued: "The *prima facie* aim is to get students reading the FT [Financial Times newspaper], and get them reflecting in groups and interacting about the articles they read." In the context of Peter's *finance* modules, too many of the students behave as "…instrumentalists, working out the most efficient means to get a 2.1 grade…" (the level widely viewed as adequate).

The solution involved the use of online discussion forums *with well structured activities*. This has the advantage of allowing time to reflect, time to think, time not to worry about the choice of words, so as to concentrate on the content of messages in the intellectual interaction. It also creates a record of each student's input into the seminar group, visually associated with the student's name and portrait photo in the system. The social participation is therefore meaningful, enduring, but not as pressurized than in the live seminar situation (although face-to-face seminars continued as before). The activity was at first voluntary, with a pass rate of 50%. Peter realised that he had to make it

compulsory, contributing 15% to the overall module mark, to stand any chance of getting the “instrumentalist” students to engage. He is now able to tell a story about a student who had to resit the module exam because they missed out on the 15%.

Even with the 15% portion of the final assessment, there are no guarantees that the students will put much effort into taking part. Their commitment to social participation needs some additional *architecting* – they need to be nudged and funneled through a repeated series of actions and reflections that then establish the desired socially-engaged behaviour as the default. Peter organises the students into many small groups. The annual cohort is about 200 students (in recent years reduced down from a high-point of 430). There are 10 face-to-face seminar groups of 20 students. Peter has found that smaller groups work best, generating a sense of interdependency between the students. Each week, the seminar groups are divided into smaller groups of 10. They are then given an online task – responding to a recent article selected by Peter from the FT or Economist. The groups work together online for a week to respond to each article and some guiding questions and directions from Peter. At a set deadline, a switch around occurs. The two sub-groups in each seminar are assigned access to each other’s responses, and must then peer review the opposite group’s work, adding comments. Peter then assesses the peer review comments, as well as the original contributions.

This format ensures that every student has plenty of opportunities to engage with other students over topical news items. The trick is to make them feel a

sense of obligation to the group, the developing collective response, and perhaps even more widely to the development of an academic perspective (as opposed to a more shallow journalistic perspective). This requires plenty of nudging. The peer review element acts as a nudge to collaborate – knowing that another team of students might find weaknesses in the overall response encourages the participants to care for each other's learning. The danger is that this could result in some already dominant individuals seeking to silence other participants. A carefully designed set of explicit and tacit rules prevents this from happening. A response of a specified length is required from *each* student in the team. There is a maximum upper limit on the number of words that each student is allowed to post. They are therefore nudged to think carefully about their contributions, *choosing* to use their allowance strategically to develop an overall good response by the whole group. Nudged towards collaborative action and learning – socialized, as Peter describes it. A very canny design.

This example from WBS represents a choice architecture that works repetitively on a very focused range of possibilities. At the other end of the scale, curriculum designs may be conceived as much more complex, or even supercomplex, choice architectures. They might even respond dynamically to the choices made by students. We might classify such a curriculum as a platform, out of which the student assembles their own learning pathways. This might then produce non-linear effects, with teachers responding to the interests and critical-creative responses of the students, along with their own shifting interests and resource commitments. Such curriculums may be hard to pin down. This is seen as a kind of *drift* away from formal specifications

(confirmed by all of the people I interviewed about curriculum design, including the head of the Teaching Quality Office at Warwick, Katherine Gray).

### *Redesigning the undergraduate History curriculum*

The undergraduate History curriculum at Warwick is a good example of a curriculum constructed as a choice architecture under conditions of supercomplexity – one with which I have personal experience as a teacher and academic technology systems designer. Over two years it has been transformed (first by Professor Mark Knights and then by Professor Giorgio Riello) so as to address a much broader range of agendas, including employability and social impact. This has not been a smoothly executed redesign – the supercomplex conditions work against it being such. Over time the emphasis of the first year of the curriculum has shifted between:

- a focus on skills and "different ways of making history" (as Giorgio Riello described it in our interview) – thus equipping the students to become more independent as learners and historians;
- content – giving them a broad base from which to develop their knowledge.

The students have called for *more content*, giving them a more clearly visible sense of achievement and progress. The teachers have wanted to develop the students' independent capabilities. A compromise has emerged, with more content, but still the aim that:

> "By the end of the year the students should be able to do a project in which they choose their own primary sources, they go into an archive in the Modern Records Centre, and produce a project that is their own" (Giorgio Riello interviewed June 2014).

This resistance to the more radical curriculum design might represent a kind of *consumerist* force appearing when we make choice architectures more explicit: when people are told that they have a range of options to choose from, and their choices can impact upon the perceived value of their investment (money, time, energy, opportunity-cost), they might look for some measures of comparison between options the variation of which has an understandable effect upon success. This is a variant of the *rational economic choice* view of human behaviour – making sense through economic measures. Quantity of content could be just such a variable. Although in this case it does not seem to have been quite so clear-cut. The students were perhaps nervous about a curriculum that is harder to understand and to see visibly laid out on a simple schedule. The Student as Producer agenda is well embedded at Warwick. Some aspects of the new history curriculum are influenced and enabled by it (the film making used my Student as Producer inspired facilities). This would have had a counterbalancing effect.

Despite these conservative and consumerist tendencies, an innovative element remains, and has become well accepted by the majority – becoming established as the default way of studying history at Warwick. The students are required to present their work in digital media, with the additional reflexive dimension that the students have to:

> “Think about in what ways conveying their arguments and their writing on a web site is different compared to an essay, and what they may use in terms of podcasts or video casts, inserting materials from YouTube, as many did.” (Giorgio Riello)

Riello stated that:

> “The results have been quite varied, but generally speaking I was quite pleased with what I saw, and some of the projects were extremely creative, and professionally done. They seem to struggle a lot in writing an essay, which is the traditional way in which we convey academic content, but they seem to have much more of an affinity for other formats.”

The students and their supporters are faced with the task of conceiving their own pathways through an already complex curriculum with multiple frames of reference *simultaneously* present. It is a task that defines a major aspect of their *everyday designing*, and which draws upon *design capabilities* and modes of *design thinking* of various forms and levels of sophistication. By using their existing capabilities, developing them in situ in response to the challenge, or adopting new capabilities, many (possibly most) of the students are capable of creative and worthwhile outcomes. For example, the film-making activities may be approached through a more conventional historiographical angle (film as historical artefact or text), through a philosophical critique of historical discourse and knowledge, through the lens

of career development and skills, through the social-dimension of first year students building friendships and establishing identities, within the context of knowledge transmission (lectures) and verification (exams), as original historical research (and whatever that means), as an opportunity to critique and effect society as it is today. The students seemed capable of approaching the task through many of these different lenses at the same time. It is a supercomplex activity, full of opportunities but also contentions – as was seen in the varied responses to the activity.

In 2013 and 2014 I taught and supported the film-making aspects of the module. This gave me a chance to follow the students as they made sense of the curriculum – or not, in some cases. In every one of my introductory sessions, a minority of the students (around a quarter) engaged in a debate concerning the relationship between film-making and academic history – that was a good sign, the activity was intentionally a provocation to question received wisdom concerning how history is studied and the legitimacy of different types of source material. A smaller number of students responded negatively to the introduction of an activity that did not seem to build upon their existing skills, or the skills that they regarded as relevant (writing A-Level essays for example).

Giorgio Riello believes that these varied attitudes and outcomes result from a calculation made by the students concerning how much value they will get out of more “reflective” and less immediately “productive” activities.

> “They see it as a balance between how much they invest in their

reflectiveness and how much they reflect in doing things."

Giorgio describes this reasoning as a "functionalist view". In Barnett's terms, it is a response to supercomplexity, shying away from the challenges of uncertain and competing framings and meanings, in favour of feeling and appearing to be busy. The history curriculum has evolved around these ways of thinking and acting, in response to the choices and responses made by the students.

In coping with these supercomplexities, Ron Barnett claims that we are tempted into the superficiality of *performativity without substance* – and this is certainly as possible with a novel activity like filmmaking as it is with conventional pedagogies. In his essay on "Supercomplexity and the Curriculum" Barnett points towards a contradictory set of symptoms:

> "At one level, students are likely to be more adept at handling themselves in the world in the domains of performance itself but also of cognition and self-identity. At another level, however, understanding may be contained, held back at levels which simply ensure a satisfactory performance." (Barnett, 2000: p.262)

In such circumstances, designing satisfactory curricula becomes very challenging, perhaps impossible:

> "In attempting and in apparently succeeding in helping students to live in the here-and-now, curricula may fail to impart to students the

ontological and epistemological resources for engaging meaningfully with others in a world in which nothing is certain." (*ibid.* p.262)

In the case of the history curriculum, this might appear as a failure to become embedded within the historical way of doing things, and its community, and at the same time a failure to connect the study of academic history with the student's life in the wider world. However, the new history curriculum has been explicitly posed to the students as asking them to make their own choices and innovations that re-cast both history as a discipline and new[er] technologies and cultural forms through a critical reassessment. To be critical and to establish a strong and meaningful *personal* view on the nature and purpose of historical studies (ontological and epistemological) – this is built into the curriculum as a core aim for every student, and thus acts to counter any consumerist tendencies inherent in the rational-economic response to choice architectures.

In medical education, the challenge is similar but different. The education of doctors is regulated by the General Medical Council. They define the required knowledge, skills and behaviours around which medical schools must design their curriculum: the *Tomorrow's Doctors* (2009) framework. But the framework does not specify how doctors are to be taught and how curricula should be constructed. And that gives opportunities for innovation and for diversity, for medical schools to develop their own ways of working, using available resources, but also so as to create their own local added value.

Also in June 2014, I interviewed Colin Melville, Head of Medical Education at

the Warwick Medical School (WMS). Colin explained the complexities of Warwick's evolving response to curriculum design for medics. The requirements of *Tomorrow's Doctors* are broad, and as with the History Department, are best dealt with in a way that sees students funnelled into specialisms, but with a solid appreciation of the whole. The curriculum is in this way a complex but well-constructed choice architecture. However, unlike in History, the consequences of a student making an unbalanced or incomplete pathway through are dangerous. The curriculum that gets implemented is a kind of quality assured, opportunity rich meshwork that encourages, and depends upon, the student themselves (in collaboration with tutors) understanding how to get the most out of it to meet the requirements. Feedback loops and periodic reflective reviews steer the curriculum in new directions over time – for example by making the study of mental health and the brain more of a central feature.

In both of these cases, with Giorgio Riello and Colin Melville, I discovered a sophisticated approach to designing the curriculum – combining great knowledge of the discipline with local knowledge of human, material and digital resources (and how they are evolving), along a measured and evidence-informed approach to preserving features and changing features. In short, a certain kind of designerliness. They are examples of dynamically evolving choice architectures engineered out of supercomplex conditions to give degrees of freedom and direction, as a platform out of which students co-produce their own learning pathways and experiences.

### *2.1.7 Emotional designs*

In reality, designs go well beyond Donald Norman's *Psychology of Everyday Things*. Interaction designs and experience architectures must be designed with the many non-functional aspects of human being and becoming in mind. Describing a curriculum as a choice architecture, for example, might give the wrong impression: imagining students as rational consumers and the curriculum as a deterministic range of combinations from which they make optimising selections. The supercomplexity of the curriculum as an assemblage of ever-changing people, ideas and resources means that over the three years of an undergraduate degree, and the longer life span of a curriculum design, it will never be that deterministic. We may never be able to treat teaching as a design science. However, if we have a more sophisticated view of human agency and its interaction with designed and emergent things, then we might be able to predict with a greater degree of accuracy the impacts of a design in a type of context.

In a later book on *Emotional Design* (2004), Donald Norman introduces the role of the "reflective" as one of three significant "levels" through which we relate to things and the environment. Norman's model is more sophisticated, in that it gives us a range of categories through which we can understand the relationships between people and designed things. I will later go on to argue that the adaptation of learning designs of all kinds to different forms of reflexivity is a key factor – including a *designerly reflexivity* that is embedded into some designs.

The three levels in Norman's framework are [my emphasis in bold]:

- "**Visceral design** is what nature does. We humans evolved to coexist in the environment of other humans, animals, plants, landscapes, weather, and other natural phenomena. As a result, we are exquisitely tuned to receive powerful emotional signals from the environment that get interpreted at the visceral level." (Norman, 2004: p.65) Visceral design values are encoded (deliberately or accidentally) into designed assemblages, and are *recognized* for what they are (I know that I like the feel of the iPhone) or make a *fitting* connection unconsciously, below the reflexive radar.
- "**Behavioral design** is all about use. Appearance doesn't really matter. Rationale doesn't matter. Performance does." (*ibid.* p.69) Again there may be a conscious recognition and appreciation - although following Norman's earlier work, the aim is for designs to fit behaviour without needing to rise into consciousness.
- "**Reflective design** covers a lot of territory. It is all about message, about culture, and about the meaning of a product or its use." (*ibid.* p.83) The design connects with stories – the complex and ever evolving narratives of the good and the bad around which culture is constructed and contested. A more sophisticated level of theorisation, dialogue and (often) manipulation is undertaken by designers – and the wider Capitalist system. A system of persuasion, shaping the co-adaptive dynamics of people and things.

Norman then is acknowledging the vast complexities that are made present in our embedded-ness in a *natural history* and a *cultural history*. The cultural

history of things is mediated, reproduced and modified by our reflecting upon what things *mean* to us and what *meaning* we can make with things. And that is, for Norman, something that brings designs to a very personal level – what meanings things have for me in relation to my concerns (positive and negative) and my projects in the world. Norman acknowledges the diverse ways in which this works for different people:

> "For one, it is about the meaning of things, the personal remembrances something evokes. For another, very different thing, it is about self-image and the message a product sends to others." (*ibid.* p.84)

The challenge of teaching can be considered through these three levels, and the need to attend to how our designs fit and perform well and appropriately at each level – or conversely, that issues on one level do not interfere with other aspects of the design. In my observations and interviews I found this occasionally theorised with reference to Maslow's famous "hierarchy of needs" pyramid (1943). However, most often it is part of the tacit behaviour of (good) teachers in action. In notable cases, it is more carefully theorised and designed for by more than usually reflexive teachers. Some of the award winning teachers that I interviewed told stories of how they creatively respond to the challenge of getting the three levels right. As one might expect, this is especially common amongst the teachers in Theatre Studies (Nadine Holdsworth, Nicholas Whybrow), Shakespeare studies (Carol Rutter, Nicoleta Cinpoes) and Creative Writing (David Morley, George Ttoouli, Anna Lea, James Clarke) – all disciplines that concern themselves with an

understanding of the visceral, behavioural and reflective aspects of performance. Others, such as Peter Abrahams (Warwick Medical School) and Paul Raffield (Law) bring an understanding of performance and creativity to their teaching from their artistic interests (Peter is a film maker, Paul is an actor and has appeared in many TV and stage roles).

### *2.1.8 Micro-actions, macro-actions and critical-creative interruptions*

So far in this chapter we have come a long way from the idea of a design as a simple structural assemblage, or as decoration added to functional things. Human agency, and the reflexive appreciation of agency, are key aspects of the design. But this is a complex thing. The concepts introduced so far have sought to simplify that complexity, delineating ways in which we can think about designs as complex (or supercomplex) dynamically evolving assemblages in which humans and non-human things co-adapt. Designs and the use of designs gives people control over the world, but also cause the emergence of new unexpected syntheses. But there is, as in many of the case studies detailed in this thesis, a strong sense of growth and progression *at least possible* for the human users of designs over time – a growth in capabilities and understanding that we would in the educational context call learning, and increasingly outside of educational contexts, we might call *informal learning*. We grow and learn with and through our designs and designing. Next I will introduce a crude but useful schema for modelling these processes.

If we come to the concept of design from a "conventional" *architectural* perspective (or how people might imagine architects thinking), we might only see the designed thing as a static three dimensional occupation and delineation of space. A more sophisticated view of the building sees it as being a mediator for flows of energy and people – an energetic system. Twinned to and reacting against the *more geometrical* and *system-theoretical* views, we might develop a critique of the (modern) building as a symbolic

system, as a representation and reproducer of power. And buildings can certainly do just that. For example, a University might wish to place a new student common space in a building that is obviously separate from academic places. This might signify a separation of students from academia, along with the notion that students are easily satisfied (with a bar and a refectory) by basic commercial services in a distinct commercial zone of the campus. This could be an unconscious design aim, or the symbolism might be deliberate. It certainly would be contentious, and taken up as a symbol of an uneven power struggle at the heart of the institution – as was the case at Warwick in the early 70s. A critical perspective on this controversy is documented by E.P. Thompson in his classic account *Warwick University Ltd.* (1971).

In actuality, many architects have long-since moved on from these mind-sets (although some institutional leaders might cling to them). An interview with practitioners from the architecture firm Berman Guedes Stretton (working at Warwick) was detailed in chapter 1.9.1. Their approach is sophisticated and informed by experience and research. But it also chimes with ideas in social theory – for example that spaces may be "non-representational" (Thrift, 2008) and "open" in a way that goes against *space as symbolic representation*. Thrift (Warwick's Vice Chancellor and originator of the concept of "non-representational space") wrote of such spaces:

> "...becoming a spatialized matrix of becoming, a continuously unfolding field, a surface for making provocations which, though calculated in all kinds of ways, can have open outcomes." (Thrift, 2008: p.98)

And this might work out, in the Capitalist system, as:

> "…space itself becomes a means for conveying information and communication - actual qualities loaded with affective as well as cognitive value - with the goal of *approximating the rhythm of thought*, rather than simply a material template through which information and communication must be conveyed." (Thrift, 2008: p.98)

But there are other possibilities. We might use these encoded/encodable spaces to:

> "...construct quick-fire 'instant' communities by drawing on bodies of understanding which allow these communities to both be founded and have grip, in particular by making systematic knowledge tacit through the various means for systematizing tacit knowledge that can now be found and applied" (Thrift, 2008: p.91).

In architectural theory, this has manifested itself as a new Baroque, a philosophy of singular surface (not hierarchies), fabric, flows and folds.

The biggest change has then been an attention to how action takes place with/within a design – the complexity and unpredictable nature of this as it evolves in a co-adaptive relationship *over time*, and how it actively develops the "user's" goals, values, perceptions etc. This leads to the realisation that people actually do *think,* usually in a non-deterministic way, with/through designs. But also that there are ways of designing-in opportunities for what I

call *critical-creative interruptions* in the relationships between people and designed things. Interruptions that prompt reflection, reflexivity and creativity, rather than frustration. This then leads beyond functional design, towards more sophisticated *enabling* and *emotionally durable* connections between the design and the user.

For example, in architectural history, we can see a trend towards creating diverse places for diverse ways of acting-thinking-being. In the University context, places are provided for *busyness*, as informational interchanges and market-places. But also for *slowness* and reflection. At the University of Kent (in Canterbury, UK) a labyrinth has been created and is used in teaching.[70] We might draw a relation between this and innovative spaces created for museums and places of remembrance – Daniel Libeskind's *Jewish Museum* in Berlin being a new archetype. However, we can also build such "moments" into more everyday designs. As will be seen, this is essential to "learning design" – encouraging (with varying degrees of directness) the reflective/reflexive loop.

But reflection is only part of the story, through which users put designs into the context of their value systems with a more or less critical stance. Most of the time they are absorbed in action. And designers will often want their designs to disappear into the background (for Donald Norman's functional view, this would be the whole point of designing). But even then human intelligence complicates the relationship between action and design. Actions are often, if not always, doubled-up in their significance and their implications

[70] http://www.kent.ac.uk/creativecampus/projects/learning/labyrinth/about.html

– we see them from two dimensions or two time-scales. We have a bigger picture of where we want to be, ultimate goals of our actions – we could call this a project view, and actions seen from this perspective as *macro-actions*. And at the same time we attend to, but hope to unconsciously execute without friction, many *micro-actions* that work us and the world towards those bigger goals.

A design that works on both levels, with *micro-actions* giving us a sense of progress towards *macro-actions*, and aligned with our values (and which reinforces our sense of having the right values), might be experienced as a *good design*. But just as valuable are the designs in which the micro interrupts or re-orientates the macro, causing critical-creative interruptions, perhaps leading to a revaluation of our values and goals – such designs might also be described as *good designs*, although the recognition of their good perhaps comes later. A third category includes designs that work against our conscious plans, but for a greater good (for example, crowd control measures) – a more contentious *good*.

And that is, I argue, the purpose of the designerly way of thinking. Agreeing with Latour, there *is* always an ethical dimension to designing:

> "…it necessarily involves an ethical dimension which is tied into the obvious question of good versus bad design." (Latour 2008, p.5)

In teaching and learning, all three of these types of design are necessarily experienced: smoothly functioning (reducing extraneous cognitive load and

giving constructive alignment); creative-critical interruptions (for example in Christian Smith's design for teaching about modernity in English Literature the system is designed to continually feed conflicting ideas into the learning dialogue); designs working against conscious plans (the Open-space Learning methodology deliberately sets out to disrupt the student's desire for content transmission from the teacher).

### *2.1.9 Framings, propositions, stories and the system of placements*

A design, in its use *and* its broader impact (emotional, cultural, environmental etc.) can be analysed as a pre-arranged combination of distinct matters or events (systems, materials, ideas etc.) enabling a range of affects and micro-actions (which can be thought of in terms of affordances, constraints and enabling constraints). The affects and micro-actions might be almost imperceptible to the human user – and as Norman argues, might be best arranged to offer no friction to agency, and subsequently no cause for interruption. Or alternatively might necessarily lead more directly to thought.

Every design feature has an impact upon its environment. Every design leaves a trace (however small) in the brains of those who interact with it. We might want to foreground these impacts for reflection, or we might wish to hide them away. In either case, the design is enframed within a set of propositions concerning actions and consequences (cause and effect), leading between micro and macro, and aligned to goals and values. We design by constructing stories in which our designed things have an agency for people and in the wider contexts into which they are deployed. When aiming to create designs that have significant and lasting impact, achieving enduring fit, stick, spread and grow, designers do well in listening to the advice given by Jonathan Chapman:

> "A captivating narrative must play on our deepest desires, dreams and fears in order to hold us in its grasp, enchanted and helpless."
> (Chapman, 2005: p.121)

The lesson learned by Apple is that even everyday things like the telephone can be designed around such narratives, offering delight to the user in the sequences of micro-actions, interactions and affects that lead to small but satisfying results. Chapman continues:

> "Stories may flex and warp in reaction to audience feedback, allowing them to be tailored in real time, rendering storytelling a cyclic process of continual feedback and feed-forward." (*ibid.* p.121)

And:

> "Storytelling may also be deployed as an agent of memory, where abstract scenarios can be woven into known narrative sequences to assist in both the storage and recall of complex experiences." (*ibid.* p.121-122)

Memory is an essential aspect in enduring fit, stick, spread and grow. Chapman then goes on to detail the complexities of the narrative forms of designed things, and the importance of layering and unfolding (recall my earlier point about designing and the new Baroque, enfolding and unfolding experience and action). Get it wrong, and the design is consumed too fast, or rather becomes a consumable – what Chapman calls "de-fictioning" (*ibid*. p.142). It shallows out and leaves no memory, no space for deliberation or agency – which might be the aim of some designs, but where we design in a broader context, aiming for a joined-up durable experience architecture, a more substantial relationship between the person and the designed thing is

desired - hence the step up from the gadget in itself to the platform, which has environmental benefits as well as commercial in the way in which it raises bigger questions beyond the individual device, ethical questions of the kind that interests Latour.

The micro-actions then are interconnected in various ways, occurring sequentially in given orders, or in parallel, with micro-actions affecting each other (for example, switching on and off, modulating, rearranging). The micro-actions may then be subsumed under the greater-good of macro-actions, which tend to be longer term, more project-like commitments and expectations of which we are sometimes (or when we are more focused or anxious, continually) consciously aware – although not necessarily in full control of.[71]

So, for example, the shape and positioning of a chair is a proposition to me as a potential occupant, as someone in need of a certain ergonomic situation. And that proposed situation offers to serve the purpose of allowing me to sit at my laptop and write (and write better), so as to wrangle this text ever closer to completion, submission, which I assume leads to some higher goal aligned with my/our (or the system's) values.

When viewed in a purely instrumental way, the propositions work in one direction. And we can satisfactorily design following that logic of neatly

[71] Recent developments in "behavioral economics" are illustrating the ways in which the conditions of micro-actions unconsciously shape macro-actions and intentions through cognitive bias – see Kahneman, 2011.

interconnected propositions neatly framed by a clear-cut set of goals and values.

But when we come to examine what designers actually concern themselves with (and what as a designer in the University what I spend most of my time doing), it is often not that simple. Sometimes, the propositions flow in the other direction, from experiencing micro-actions that have some kind of lasting attraction, that leave a trace in consciousness, and then forming macro-actions (projects) so as to make those feelings endure, and then aligning our goals and values around those projects – what Norman would call the *visceral* source of design. And sometimes it goes further, with a form of *deontological* reasoning from the good that we experience in things to an ethical proposition or even a system. Latour is correct again, in that design leads us to ethics, via aesthetics.

Designers navigate these difficult waters all of the time, although perhaps only recently have they been open about the fact that designing is as much about creating goals and value propositions as it is about satisfying already existing requirements. As Donald Schön states in *Educating the Reflective Practitioner*, this creative and not entirely logical process of framing and problem development is key to what designers do:

> "Through complementary acts of naming and framing, the practitioner selects things for attention and organizes them, guided by an appreciation of the situation that gives it coherence and sets a direction for action. So problem setting is an ontological process-in

Nelson Goodman's (1978) memorable word, a form of world-making." (Schön, 1987: KL 110)

The Design Thinking of the IDEO company (detailed in 2.5.4) develops from that admission (or sudden growth in confidence spurred-on by the now obvious connection between the success of companies like Apple and the success of their designers). Design researchers have responded by turning their attention to how designers achieve these powerful "framings" (coherent sets of micro, macro, goal and value propositions). They have been especially interested in the most extreme cases of supercomplexity and what has become known as "wicked problems" - and the approaches used by designers to go from such hard-to-define challenges, to clear and effective framings.

Richard Buchanan's 1992 paper on "Wicked Problems in Design Thinking" has been especially influential. It provides a good route from the above conception of the design as a framed assemblage to the consideration of designing and designers. The systems theorists Horst Rittel and Melvin Webber (1972) introduced the concept of the "wicked problem" as a way of describing the limitations of systematic approaches to problem solving. Buchanan lists the characteristics (taken directly from Buchanan, 1992: p.16):

1. *Wicked problems* have no definitive formulation, but every formulation of a *wicked problem* corresponds to the formulation of a solution.
2. *Wicked problems* have no stopping rules.
3. Solutions to *wicked problems* cannot be true or false, only good or

bad.

4. In solving *wicked problems* there is no exhaustive list of admissible operations.
5. For every *wicked problem* there is always more than one possible explanation, with explanation depending on the *Weltanschauung* of the designer.
6. Every *wicked problem* is a symptom of another, "higher level" problem.
7. No formulation and solution of a *wicked problem* has a definitive test.
8. Solving a *wicked problem* is a "one-shot" operation, with no room for trial and error.
9. Every *wicked problem* is unique.
10. The *wicked problem* solver has no right to be wrong - they are fully responsible for their actions.

So these problems are not just matters of extreme complexity, not just cases where the requirements are so great in scope as to be beyond the capability of (human) designers. The chains of micro-action, macro-action, goals and values through which we might define the problem are un-decidable and unstable (the act of trying a solution might change the conditions of the problem – what I call *non-linearity*). Buchanan's innovation is in showing how designers address these challenges, how they are able to reach acceptable framings that are not just *satisficings* (Herbert Simon's infamous portmanteau) but actually establish new ways of seeing and being. Design Thinking as such is *transformative.*

The designerly strategy described by Buchanan is what he calls *the doctrine of placements*. Buchanan introduced the idea in contradistinction to systems

of categorisation:

> "There are so many examples of conceptual repositioning in design that it is surprising no one has recognized the systematic pattern of invention that lies behind design thinking in the twentieth century. The pattern is found not in a set of categories but in a rich, diverse, and changing set of placements, such as those identified by signs, things, actions, and thoughts." (Buchanan, 1992: p.12)

So whereas in a categorical system the designer might be called upon to recognise, categorise and reproduce a design from a well known typology (as it seems most British houses are "designed"), the "placements" approach is more like a strategy, a conversation with the complex context in which the design is to be placed. In his study of architecture students reported in *Educating the Reflective Practitioner* (1987), Donald Schön describes how a successful student approaches the challenge of designing a building as a series of "moves" in a "conversation" with things – in the case of the building, the conversation with its setting in space and in time is a significant part of the task. These moves are "placements" – not definitive solutions, but rather more-or-less confident moves accompanied by multiple levels of reflection on the consequences of the moves (which might occur in the imagination of the designer, or in a wider conversation with others including clients). Buchanan writes that:

> "The inventiveness of the designer lies in a natural or cultivated and artful ability to return to those placements and apply them to a new

> situation, discovering aspects of the situation that affect the final design." (Buchanan, 1992: p.13)

The designer then has a repertoire of such placements, and a *design knowledge* drawn from experience and from learning, to guide their moves. This is not a reductive, categorical approach, but a *generative* system, leading to framings that work – in both familiar and sometimes unfamiliar (but delightful) ways.

### *Making and reflecting through academic posters*

Out of all of the designing that I have observed in the University, poster creation is the practice in which placements and framings are used most visibly to construct a usable and impactful narrative through reflexive deliberation and creative-critical construction – mediated through an interaction with the constraints and enablements of the format. In early 2014 I interviewed a mature, part-time history student about his experience of making a poster about his Undergraduate Research Support Scheme (URSS) research project. Barclay told me that:

> To start of I was resentful about what seemed a waste of time - having to make a poster. But that changed during the poster making. Because:
>
> 1. I learned more about making posters – and came to see it as a valuable skill in itself. I enjoyed the creative aesthetic process. It will stay with me over time, something beautiful and enduring. It is

emotional. And people who have seen it will not forget it. I don't want to get rid of it, I will keep it until I die! More so than essays – because it gave me a freedom to express myself, whereas in a module essay environment I can't – I feel that I am better able to express what I want to say my way than *their* [conventional academic] way. Giving students more freedom to choose the medium for academic expression is very important. In the normal academic way I can't say what I want to say, I feel constrained by conventions.

2. I found that I started to say exactly what I wanted to say through different mediums, combing text and photos. The most important part in the production was being able to make a big impact through the visual medium (especially concerning the psychological trauma experienced in WWII by civilians in Coventry) – something tragic that this is overlooked. When I presented it on the day, in the URSS poster exhibition, it got an extremely favourable reception, and it generated a great deal of interest. The poster format enabled me to summarise in a way that is immediate and impactful. Nathalie's poster workshop [Nathalie Dalton-King, URSS coordinator] was essential, really valuable to know about layout and things to avoid and how to get it right. That helps with the impact. It is also raising questions about whether to be an academic or not – considering the constraints of academic writing.

Academic poster making is a fascinating and, it seems, under-appreciated activity. Along with other non-traditional media (web sites, blogs, videos) I

have found it to be a powerful “reflective practicum” (Schön’s term) for the making of academic identities, projects, and the [re]making of the University, and more importantly, for the development of the forms of agency and reflexivity that are behind this remaking. As we can see in Barclay’s case, it is helping him through what he might experience as a *wicked problem* – the conflict between his commitment to the goals of *academic historians* and the compromises imposed by the organisation and format of their work. And *designerliness* plays an essential role. Nathalie Dalton-King’s designerly advice was a catalyst. The experience of making a poster, I have found, can prompt the shift in thinking from a passive “what am I doing here?” to an active “what am I making here?” – in which agents grasp the essential creative and designerly dimensions of their agency, and produce something with *emotional durability.* Barclay discovered, through his poster making, the real enduring impact of his student-researcher production. And this was all made possible by having to place words and pictures onto an A2 sized sheet, playing with the limitations of the space and the medium to find an effective, authentic and impactful framing.

Poster exhibitions are increasingly common, especially in the science and technology subjects. I have been involved in post-graduate poster exhibitions since 2005. The Graduate School at Warwick holds an annual PhD student poster exhibition, and on several occasions I have been a judge on the panel awarding prizes. More recently, the end-of-project poster exhibition has become a key element of the Undergraduate Research Support Scheme. I have also supported teachers in making posters for display at our Faculty and Institutional Teaching and Learning Showcase events. I have then witnessed

the transformative effect that poster-making sometimes has.

As a design challenge, the academic poster is similar but different from other more familiar (at least for most people at Warwick) media for academic expression. As with film making, the translation of the academic project from text (most usually in essay format) to a different format brings into play both a different set of production skills and a different narrative form. The most usual approach to the design of academic posters is to tell a story, represented as a flow on the page to be followed by the inquisitive gaze of the audience. In poster exhibitions the poster-author will often act as a presenter-guide, standing next to the poster and helping a small *ad hoc* audience through the narrative. In the best cases, the winning cases, the layout of the poster does much of this work in itself, but also suggests points at which the viewer might turn to the presenter and engage. The presenter may then turn back to the poster, perhaps to a diagram or photograph, to elaborate their explanation through the material on the poster. The poster is then a more sophisticated and complex designed assemblage than we might at first assume. Not only does it exist on paper, but also in time and space extended around the paper in the setting of its presentation (and rehearsal) with or without the presenter (appearing, after the event, on a common room wall). It is a design to be performed by an ensemble that involves the presenter (present or virtual), the audience and the encoded design. As such it contains the *design-in-mind*, the *design-in-use* and the *design-as-experienced* – in complex interaction. And that is a significant design challenge to coordinate and produce.

The full assemblage of poster, ideas, narrative, presenter, setting etc. gives a

balance of predictability and structure with an opportunity for the viewer to feel engaged. The poster is then somewhat like a pitch. And as a performance it uses (often unconscious) rhetorical methods similar to those described by Kimberley Elsbach in her *Harvard Business Review* paper on "How to Pitch a Brilliant Idea" (2003).

Eslbach's study of "pitching and catching" in the "$50 billion U.S. film and television industry" found that successful pitches engage the audience at multiple levels simultaneously – not just content and argument, but also through raising and answering *social* questions concerning *types of person*. She found three strategies in use:

> "…the *showrunner*, the *artist*, and the *neophyte*. Showrunners come off as professionals who combine creative inspiration with production know-how. Artists appear to be quirky and unpolished and to prefer the world of creative ideas to quotidian reality. Neophytes tend to be—or act as if they were—young, inexperienced, and naïve." (Elsbach, 2003: p.2)

Tendencies along these lines were noticed in the academic poster exhibitions, but the picture was not so clear. I have come across the occasional *showrunner* – often prompted by an already present confidence emerging from the research project itself. When I asked undergraduate student poster presenters about their presentational strategies, their responses indicated a reflexive process similar to that which might lead someone in the TV industry to take up one of Elsbach's three approaches.

However, the reflexive conversation was clouded by an uncertainty about the position of the student in relation to “real research”. In many cases, the student started-out unsure about themselves and the value of their work. Could they be the *showrunner*? That might have been presumptuous. The *artist*? – risky in an academic context. The *neophyte*? That might have been the starting point from which they were trying to escape – “young, inexperienced, and naïve”. However, in many cases, where reflexive thinking (about the student’s own position, concerns, values etc.) was prompted by the poster making process, the student had grown in confidence and translated their project into a presentable narrative without the need for such Californian rhetorical devices.

In this way, the process of translating a complex and messy research project and becoming-an-academic into the poster format triggers reflective thinking (on the project and its representation) and reflexive thinking (about self as an academic). It can be a transformative process. A process of *designing* a representational artefact that might prompt questions and actions concerning the design of a research project, a career, the University, the social and political world in which it sits. The student then might go from *reflection-in-action* to a deeper, more inclusive, *reflection-on-action* (using Schön’s terminology from *Educating the Reflective Practitioner*, 1997). Again, there is a mangrove effect at play, and a *designerly conversation with the materials*. In a couple of cases there was evidence of this going a little further. The students demonstrated a reflexive awareness of these effects and of the link between their *designerly* actions and methods and the evolution of their concerns, project and practices – there was then a kind of *designerly*

*reflexivity* at play.

We might expect undergraduate's to be going through formative processes like these – especially considering the uncertain position of undergraduate research in the University (progressive voices are telling them that they are genuine researchers, but there are plenty of tacit signals indicating otherwise). But what of PhD students and staff? They seem to be more confident, and in recent years, more *stereotypical* in the posters and narratives that are produced. Poster making is on its way to being a normal part of academic practice in some disciplines – especially science and technology. Arts Faculty posters are still hugely under-represented in the PhD poster exhibition, and in the common rooms and public spaces in the faculty. Some departments have made an additional effort to encourage posters – French Studies and History have prominent displays in their department spaces. Talking to Arts Faculty students indicates a greater amount of reflectivity and reflexivity occurring during the poster making process.

The scientists seem to have settled into fitting relatively standard-form projects into standard-form posters. Social Scientists are somewhere in between, and as with the inter-faculty PhD student interviewed as part of my investigation of technology use[72] (Medicine and Social Science) tend to focus more upon the personal and social stories of the subjects of their studies. Photographs of real people in real places tend to dominate their presentations. This might reveal a significant difference. In another context, I was surprised to find several Social Science students answering the question

[72] Discussed in the section on "Why is this a matter of urgency?" (1.9).

"what do you want to get out of this research project?" by describing how their research would improve the world – whereas the question had been framed to elicit a statement about how the project would develop the student's personal capabilities! The scientists typically respond with a list of (quite vague) transferable skills and (too specific) technical knowledge.

As with PhD students, academic staff responses to poster making vary. However, most of the staff poster making that I have studied (and participated in) relates to the presentation of teaching and learning innovations. As with the undergraduate researchers, this seems to bring into consciousness issues concerning *ambiguous status*. In a research university, the value of teaching and time taken to innovate in teaching has not been so clearly stated, rewarded and made easy (until recently). Research active staff have required additional encouragement to present at Teaching and Learning Showcase events. Even today, they are hugely outnumbered by "admin", support and teaching-only staff. Very few posters for such events have been produced by research-active staff. The two Centres for Excellence in Teaching and Learning (CAPITAL, Reinvention) and their successor the Institute for Advanced Teaching and Learning have had a significant impact in attracting research staff into funded and well supported projects – often as collaborations with PhD students and undergraduate students (to be described further below). Poster exhibitions (and the wider Teaching and Learning Showcase setting) have, however, served as a reflective-reflexive medium for the emergence of networks of teaching and learning innovators who are creating unorthodox careers and roles within the University – for example, academic technologists. This is playing a part in changing the

nature of the University.

**In this way, a new kind of *everyday designerliness* is playing a role in the [re]making of the University.**

### *2.1.10 Summary: designed & emergent assemblages in the University*

We ended Part One with a consideration of the urgency of this project: the need for a more sophisticated and better distributed design capability across the University. That concluded with a simple design artefact that has significant consequences: the addition of sofas to common spaces. In this chapter the full scope of what we mean by "a design" has been examined, in terms of the powerful roles of both straightforwardly functional and more ambient features. Designs were shown to be complex, dynamically changing and changeable, *transversal* assemblages of components of many types – including design ideas, values and people (with all their complexities). The implication is that designing is hard, designing in the University (with all of its supercomplexities) is even more of a continual and highly demanding challenge. However, by stepping back from the design of specific assemblages and focusing upon the design of assemblage-enabling platforms we *might* simplify the challenge. Ultimately, we could begin to treat the whole University as a platform, or a set of intersecting platforms – a common ground for learning, research, personal growth and daily life. That kind of design thinking fits well with the evolution of designs in the wider world, which is becoming ever more platform centric. It also fits with the shifting focus of political matters, towards questions of who owns and who designs the platforms that we depend upon.

The development of the built environment at Warwick illustrates the current disjunction between a *participatory* designing and the development of the platform. As documented in Part One, the University grew in fits and starts with little investment in developing the University as a designerly community continually involved in its designing, and able to make the most of the opportunities afforded by its developments – other than in an *ad hoc* manner. A design history of the place, accessible to ordinary people to aid their making use of it and making contributions to its future development, has as a consequence been absent. As will be seen in the next chapter (2.2 on designing in the University), the repertoire of design ideas concerning affects, choice architectures, emotional designs, learning designs, the assemblage of micro and macro actions, framings and placements is, as a consequence, slim and inaccessible to everyday designers. The good news is that this is beginning to change, the importance of a rich and widely understood design repertoire is becoming obvious. The design work already done in *physical space* by innovating agencies[73] has broadened the repertoire and established an easily accessed design history that reconnects "…both whole campuses and individual learning spaces." (Neary & Thody, 2009: p.36) Whereas this might have just become a series of disconnected aesthetically-experimental spaces, a kind of "sculpture trail", a more strategic level of thinking and acting is connecting the components together into something closer to a platform, a "learning landscape" from the simple but challenging common-ground of the Reinvention Centre's soft heated floor outwards (*ibid.* p.38).

[73] Reinvention Centre, the CAPITAL Centre, IATL, the Library, Students' Union and IT Services.

But will this also transfer to other dimensions of designs in the University – for example curriculum design? – in which the relationship between micro-actions and the macro-action of the formal academic process is less easily mediated through “critical-creative interruptions”. In some instances (History, Warwick Medical School) there is already present the more sophisticated design thinking necessary for creating viable designs *despite* the supercomplexity introduced by an open and participatory approach to designing, in which space is made for critical-creative interruptions, reflection and redesign. I argue that this is the big challenge, one which will test the University’s design capabilities to their limits and beyond. Is it capable of meeting this challenge?

## 2.2 Designing

> "Designing and developing anything of consequence is incredibly challenging… Our goal is to try to bring a calm and simplicity to what are incredibly complex problems so that you're not aware really of the solution, you're not aware of how hard the problem was that was eventually solved." (Sir Jonathan Ive of Apple interviewed by Shane Richmond for the Daily Telegraph, June 2012) [74]

The assemblage account of *a design* has already slipped into an explanation of *designing*. Designs are meaningful within a multi-dimensional framework of human agency, combining micro-actions, macro-actions and critical-creative interruptions. Designing today is more of a continual process of fitting these dimensions together through assemblages and assemblage-enabling platforms. The imperative to design was shown to leave at least a trace, and sometimes remains consciously present, in the designed assemblage. Some designed assemblages actively encourage us to design, to make more from the platforms in which they are based. Values are designed-into designs. Design ideas can embody specific values, and features of the design are connected together into the promise of fulfilling projects and addressing concerns that promote those values (so called value-propositions). This might even include the signature style of the designer (taking us closer to the popular 20th Century notion of design). In academia, the signature style of the academic and the discipline matters very much.

Actions, affects, interactions, emotions, framings – these aspects of a design

[74] http://www.telegraph.co.uk/technology/apple/9283706/Jonathan-Ive-interview-simplicity-isnt-simple.html

are encoded into designed assemblages. They may be more or less deliberative or emergent. So how does this deliberative production work? That is to say, how are things *designed?* The answer depends very much on the context we are talking about. Designing in an architecture firm has differences and similarities with designing computer software. Designing in the University is likely to differ yet again, and to be filled with many different contexts in which designing happens in different ways.

Following the exploration of the design in Chapter 2.1, we need an explanation of *designing* – as both an agentic *and* emergent process. My understanding of this flows out of the assemblage theory of designs – humans being both *assembled as assemblages* and *assemblers of assemblages.* However, it is compatible with accounts of professional design practice *and* with other emerging theories of design – we are all responding to and in some ways influencing new ways of thinking, producing and participating, under the influence of revolutionary forces (especially ubiquitous computing, which puts interfaces, sensors and programs into every habitable space and every human activity).

As will be seen the border between the *design-in-use* and the act of designing is not so well delineated, and perhaps beginning to disappear – more than ever, devices and services are valuable to us as designs because of the ways in which they afford redesign - of us, of our world and of the design-facilitating designs themselves. Platforms are ever-more *hackable.* Consequently, it is becoming less clear where the necessary agency lies. But designing is not disappearing as a consequence of that blurring, it is becoming more pervasive and *everyday* - ubiquitous designing perhaps, and hence requiring

a better understanding of how it works and how to do it well. At the very least that might bridge the gap between me and my Minecraft addicted children (for whom the concept of “mods” is entirely natural). And then that should inform our understanding of future modes of agency and organisation – especially in the University, which might in the future be reconsidered to be one amongst many hackable platforms (the MOOC being just one way in which it might be turned into a platform).

This account of designing is very much an early 21st Century account, responding to these developments. It is also an account that steps back from a specific configuration of designing in the practice of professional designers in design studios – my description sees designing as a more ubiquitous practice, as a continual mediation between humans and their ecosystems, which may sometimes be undertaken using the formal and informal methods of the studio, and at other times (increasingly) occurs outside of professional design practice (I will deal with this in more depth when discussing *designers, designerliness and design capability* below).

Starting with a simple idea. My opening definition is:

> Designing is the working and reworking of emergent matters (non-designed things) and existing designs, into new designs, so as to enhance our practices, realize our projects and address our concerns about the world and ourselves.
>
> There is a multi-dimensionality to designing. We might design assemblages to get things done in the short-term. We might design platforms (digital and physical) so as to make the task of designing

and using assemblages easier, more sustainable, cheaper, less obtrusive etc. We might extend the repertoire of design variations available to us and others. We might design the means and methods through which we design assemblages and platforms – including the means through which design ideas spread between cases, places and people.

Despite all of these complexities, designing can be seen to be an activity that works towards achieving a good degree of *fit* between our practices (as designed assemblages and platforms), our projects (as designed assemblages) and our values and concerns. The fit allows us to work on our projects, address our concerns and values, and improve our practices. Designing seeks designs that will continue to fit for a length of time that justifies the effort, *sticking* with us. We *might* also be concerned about our designs *spreading* to other contexts and people, and feeding-back to *grow* our capability for further successful designing.

There are many different patterns and strategies that we can use to do this designing. We can be more-or-less: organised, deliberate, open to accident and emergence, determined, professional. We can be guided by many different design values, for example: beauty, simplicity, sustainability, power, equality.

This is a working definition (as with all good philosophical concepts), although one that has persisted and proved its worth through this research. In this chapter I develop these ideas into a philosophy of designing, based upon a view of human agency, cognition and reflexivity. And from that a framework

for thinking about designing and designers (fit, stick, spread and grow). Throughout the chapter the emerging framework is applied to designing in the University.

Why do we need a *new* philosophy of designing? Designing is historically and geophilosophically[75] contingent. And I am looking to view a place and a time through the lens of the designerly world-view.

In *The Sciences of The Artificial*, Herbert Simon famously stated that:

> "…the proper study of mankind is the science of design, not only as the professional component of a technical education but as a core discipline for every liberally educated man." (in Buchanan, 1992: p.9)

Richard Buchanan is correct to point out how un-contentious that now seems (although Simon's belief is still not widely shared):

> "…there is little reason to disagree with the idea that all men and women may benefit from an early understanding of the disciplines of design in the contemporary world." (*ibid.* p.9)

But the key phrase there is "the contemporary world" – because *designing* is not a "natural" phenomena (that is, distinct to human history). As Buchanan notes, the doctrine of placements has emerged together with the modern world of things and systems, connected to forms of agency and reflexivity present now but not so prevalent, or even impossible, in the past. The practice and purpose of designing thus varies in time and place (there are even now, despite globalisation, cultural differences). In recent years,

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[75] Deleuze & Guattari's term "geophilosophy" ties concepts to physical locations in time and space (1991/1994).

machines have become intelligent, crowds have demonstrated a wisdom independent of a single mind, and the environment has started to bite back. Design changes and methods for designing are contended, and have a non-linear relationship to the nature of the world and its problems to which they apply. An intriguing question is: what role is the University playing in this evolutionary history of designing?

In this chapter (on designing) I begin with a philosophical and theoretical exploration and synthesis of the concept of *designing* based upon academic literature (especially Schön, Cross, Lawson and Buchanan) and my observations and experiments, before moving on to a categorisation of types of designers and the distribution of *design capabilities* in the University (in Chapter 2.3) – introducing three broad categories (professional, guerrilla, everyday). Designers of all kinds are said to be agents more or less successfully searching for designs that *fit, stick, spread and grow* – and (for the more reflexive agents) *platforms* that facilitate their search. This is then followed by an exploration of the challenges produced by these forms and distributions (Chapter 2.4) and a consideration of strategies for dealing with those challenges (Chapter 2.5) – especially the Design Thinking strategy of IDEO.

### *2.2.1 Design innovation, design change and measuring design impact*

Earlier in the life of this research project I used the terms *design innovation* and *design change* to describe the subject of my studies to my research participants. Design innovation is an especially attractive term from a *political* perspective, giving some means for evaluating the relative impact of design activity. But as I discovered, the terms are problematic.

To describe an act of designing, and its outputs, as *innovative* ascribes some special value in relation to other acts of designing. I might, for example, say that I am designing a lecture, but then proceed to do so according to patterns that I have acquired by imitation from attending the lectures of many other lecturers. That cannot possibly be innovative. It might be new to me. I might be adopting/adapting a different design. In which case a "design change" has occurred. And there might be a *creative* element to the specific composition of elements. But does it count as innovative? There is then a difference between *designing* and *innovating*. But we might also add a definition of *design innovation*. In the case of the lecture, my combination of "idea 1" with "idea 2" could be an innovative move within my discipline. But the format, the design of the lecture is in no way a *design innovation*. But then if we consider my pedagogical strategy of combining the two ideas in a certain order, then that might pass the criteria of being a (pedagogical) design innovation. In reality these terms are complex and contentious. But I do not think that is a significant barrier to their use. We might conclude that there are degrees of fit with the term "design innovation" as much as there are degrees of fit with the idea that we are "designing" when we undertake a practice or a project

afresh. In reality, designing is practiced with varying degrees of innovativeness, related to the multi-dimensionality of designing, where changes to the platform and the repertoire of possible designs tends towards the innovative end of the spectrum.

But in some contexts designing is often closer to innovation. An additional level of complexity exists in educational designs, where we might want participants themselves (teachers or students) to modify or create designs so as to achieve better fit, stick, spread and growth. In the conventional *Diffusions of Innovation* model (where innovations are invented by specialists and transmitted to users who adopt at different rates) this would be termed "re-invention" (Rogers, 2005: KL 968), and is considered to be a rare occurrence. In the University, re-invention is everywhere – although different people have different degrees of power when it comes to changing the fabric of the place (the core platforms). The process of modification and creation might even be an important learning objective - where students become designers or co-designers, either to learn by unpicking existing designs, to learn about the constraints and enablements that are present in a domain, or to produce genuine innovations of their own (students as producers/designers). This will inevitably involve a reflexive designing of the means of designing. It gets complicated, especially when a point is reached at which we should probably abandon an old design.

Designs can be too sticky when significant cognitive or social dependencies are built-up around them. We might call the un-sticking of these fixations *design change*. Writing in *The Sciences of the Artificial*, Herbert Simon

described how this resistance to change is to some extent built into designs as *homeostasis*:

> "...the designer insulates the inner system from the environment, so that an invariant relation is maintained between inner system and goal, independent of variations over a wide range…" (Simon, 1969: p.8)

In some cases we need to get away from this "insulation" from change. Reflexivity, critical thinking, sketching, storyboarding (and other representational means of visualising the design in use), creativity and play are required in order to move things on, whether that leads to design change or more radical design innovation. These cognitive and social activities are just as important in designing as are requirements gathering, analysis, planning and management.

In reality it is increasingly difficult for us to identify when we are designing for design innovation or design change. As platforms become more malleable, open-sourced, there are fewer distinct boundaries. The distinction has become a matter of degrees. A design change undertaken by one person might grow in significance and spread to others, taking on an unforeseen significance and eventually appearing to be innovative. This suggests a different set of concepts with a different emphasis. We might instead ask of an act of designing *are its outputs **spreading** to other contexts and other people?* and *does it significantly and enduringly **grow** our repertoire of designs, our capability for achieving our goals and for further designing (that is to say, our **design capability**)?*

### *2.2.2 Design-in-mind, design-in-use, design-as-experienced*

Designing is a mediation between three aspects of designs:

- The *design-in-mind* (the blueprint, the mental model, the placement).
- The *design-in-use* (as adopted/adapted and continually maintained and modified) as an *assemblage* of different designed and emergent things, of different orders of being.
- The *design-as-experienced* by different people in different contexts.

This idea of three dimensions in the life of a design is derived from design theory (see for example Kimbell, 2012), but was brought into focus by a paper concerning the design of an outcome-based medical curriculum (Ross & Davies, 1999). In an interview in 2012, David Davies (Warwick Medical School) described to me how the curriculum for postgraduate doctor training is designed with an awareness of the asymmetry between the three aspects: curriculum-as-intended (my design-in-mind concept), curriculum-as-implemented (design-in-action) and curriculum-as-experienced (design-as-experienced) – outcomes are a result of complex interactions over time of all three aspects, plus their apprehension and theorisation by teachers, students and other participants.

Designs might vary in how the three dimensions are related. For example, the design for a software platform might leave plenty of space for customisation and creativity with the *design-in-use*. I defined *a design* as “a recognisable pattern of practices, to some extent intentionally constructed and controlled”.

This leaves space for the “to some extent” – openness to emergence.

### *2.2.3 Successful designing: fit, stick, spread and grow*

When a *design-in-mind* aligns with the reality of the *design-in-use* and the *design-as-experienced* to positively contribute to the achievement of goals, the furtherance of values or the alleviation of concerns, we can say that the designed assemblage *fits* – although it might not go on fitting forever. A design that sticks with us, continues to be useful, or evolves with our changing circumstances, continues to fit. Components in a design, including behaviours and ideas, can continue to fit long after the original assemblage has faded away. We might call this the *collateral benefit* of the designed assemblage. Learning is a collateral benefit in some cases.

This leads to a definition of *good designing* as successful *design change* (not necessarily *innovation* in the big sense), moving to different or altered assemblages, where success combines four ingredients: *fit, stick, spread and grow*. Designing is a search for fit. Good designing goes beyond immediate fit to stick, spread and grow.

These principles are *ethical* in the *deontological* sense – being general values immanent to an ontological arrangement of things. As such they beg more questions than they answer. However their role is to provide a designerly frame for understanding events and intentions in situations to be encountered in the social world today. The formula is as follows:

> An effective, successful design change sees the adoption of practice (including technologies) that **fits** better with *our* purposes, concerns, knowledge, concepts, skills, social context, aesthetics and other

enablements and constraints as they develop interactively with the new practice (functionally and emotionally); **sticks** with us, enduring over a time span that justifies the effort in creating, adopting, adapting and maintaining it, and continues to be useful as our personal goals and concerns change; **spreads** to other people and other contexts, thus enhancing our capability to support it through a collaborative 'network effect'[76]; and **grows** in some of its aspects, in useful ways over time, leading to a growth in our capabilities, and perhaps a positive development of our motivating concerns.

Fit, stick, spread and grow – an elegant formulation that has easily resonated with the experiences and imaginations of many of this projects participants. It provides a series of routes into thinking about things in a designerly way. It also leads into many complex issues – not the least of which is understanding exactly what it means for a design to *fit* – With who? With what? How? Is it a simple matching process? Or a more complex co-adaptation? How do things come to fit and later lose their fit? How can we be objective about this?

In exploring these questions I have made a productive detour into social theory and its more general investigation of change – especially in theories that account for emergent, unpredictable inventiveness. What drives people to search for alternatives? Why do they cast-off one set of conditions (with its constrains and enablements) and throw themselves into a different set of conditions (with different constraints and enablements)? And then what roles

[76] As defined by Shapiro & Varian, 1999.

does designing play in those changes? Leading to the question – what is special about designers and designerly ways in such processes?

When we begin thinking about design-fit and its production from a *social* perspective, there is a chance that we might privilege the third term in the formulation: *spread* – with an emphasis on how designs spread through a social system - as in the Diffusion of Innovations approach of Everett Rogers (2003) or the Actor-Network-Theory of Bruno Latour (2007). In cultural studies, with the rise to dominance of the Internet, theories of *spreadability* have risen to prominence (Jenkins, Ford & Green, 2013). This bias has its virtues. From an assemblage theory point of view, the platforms available to the assembly process can seem to be determinate. From an ecosystems perspective (and with an environmentalist ethic) assemblages have an effect upon material and social systems, sustaining or destabilising. In platform-centric terms, we can assemble with care for the platform. Fit then becomes a question of connectivity and coherence *beyond the individual*. And we can approach researching an actual *configuration* of the FSSG formula in a system, and its potential reconfigurations, from these socio-centric, eco-centric and platform-centric perspectives.

My initial approach to this research did just that, having begun from the perspective of Bruno Latour's Actor-Network-Theory (ANT) as described in *Reassembling the Social* (2007). Both Latour and Everett Rogers are followers of Gabriel Tarde. ANT might even be considered to be a variant of *Diffusion of Innovations*, as we can see in this quote:

> "The entities that Tarde is dealing with are not people but innovations, quanta of change that have a life of their own." (Latour, 2007: p.15)

I argue that there are key elements missing from the world of the ANTs, elements that are foregrounded in a study of design and designers from a more complete FSSG perspective. ANT appears weak as an explanation of cases of agency working against the flow of ideas in the network. Similarly, Rogers' *diffusionist* account relegates everyday designing to the status of merely "rejecting" or "reinventing":

> "It should be acknowledged that rejection, discontinuance, and re-invention frequently occur during the diffusion of an innovation" (Rogers, 2003: p.2686)

For Rogers, a failure to adopt innovations transmitted from sources of authority through social networks results from variations in the attitudes and abilities of receiving actors, who may be described following the well known categories:

> "(1) innovators, (2) early adopters, (3) early majority, (4) late majority, and (5) laggards." (*ibid*. KL 1083)

This is a common approach used in teaching-practice development. For example, in their investigation of "the role of the learning technologist in shaping the learning environment", Ellaway *et al.* describe how:

> "…most use of learning technology has been based on the activities of early adopters forming atomic modes of service provision." (Ellaway, Begg, Dewhurst & MacLeod, 2006: p.5)

However, in a world in which everyday designing and platforms are increasingly significant, Rogers' framework seems less relevant, and might constrain design practice in the wrong ways. Does it work as a descriptive concept for higher education? Should it be how designing is organized? It fits better with a corporate top-down or centre-outwards design strategy than a design capabilities strategy. In my studies of designing at Warwick, I found the network-centric approach of both Rogers and Latour to be of limited use. Spread is just one aspect. Reinvention is far more powerful a force.

My search for the missing element lead to the concepts of *emergent inventiveness* and *designerly reflexivity*, and the increasingly commonplace distribution of these capabilities in the everyday designing of non-professional designers in search of fit, stick, spread and grow.

Designerly reflexivity (as a concept and as a practice), I argue, preserves the balance between the four aspects of the formula: fit, stick, spread and grow. It is a way of thinking about the specific task of designing, but with the bigger picture in mind – and an essential part of that bigger picture is a self-awareness of one's own framings (and their limitations), placements and controls - and preparedness to let the materials and context with which we are working *speak back* autonomously to us. Latour does recognise the power if these forces, in a way that might be familiar to designers:

> “Action is not done under the full control of consciousness; action should rather be felt as a node, a knot, and a conglomerate of many surprising sets of agencies that have to be slowly disentangled.” (Latour, 2007: p.43)

This is an elaborated account of the constraints and affordances idea:

> “In addition to `determining' and serving as a 'backdrop for human action', things might authorize, allow, afford, encourage, permit, suggest, influence, block, render possible, forbid, and so on.” (*ibid.* p.72)

And Latour illustrates this with an interesting case, indicating the ambiguous relationship between creator and created:

> “Although marionettes offer, it seems, the most extreme case of direct causality – just follow the strings – puppeteers will rarely behave as having total control over their puppets. They will say queer things like `their marionettes suggest them to do things they will have never thought possible by themselves'.” (*ibid.* p.59)

The remarkable powers of Latour’s “marionettes” are the same powers of which artists and designers speak when they say they let the materials and the situation speak to them. It is the release of control to the intersection of diverse materials, people, platforms in an assemblage. The creative accident,

where art intersects with design, even for the architect:

> Watching the painter painting
> And all the time, the light is changing
> And he keeps painting
> That bit there, it was an accident
> But he's so pleased
> It's the best mistake, he could make
> And it's my favourite piece
> It's just great
> "An Architect's Dream", Kate Bush, 2005.[77]

It signifies in ANT a concept of *emergent inventiveness*, a source for new practice by means other than imitation. It might also align with the *designerly* idea that theories are encoded into designed things as affordances, constraints, enabling constraints, affects, framings that offer to connect our ideas and to help us to make sense of events and possibilities.

However, these forces are a little too weak and under-explored in ANT (especially in comparison to their understanding by designers). And consequently there is a danger of ANT being taken as an account in which the middle term, the mediator, the network is all powerful, pushing words into the marionette's mouth. This could blind us to interesting cases in which

[77] This is literally played out in the *Sky of Honey* section of the *Before the Dawn* stage show (Kate Bush, 2014) as the fractious relationship between a painter and 'his' marionette, which itself comes to life, wanders the stage and begins to transform the art with an uncontrollable, feral and ultimately disturbing power.

people assemble their own powerful design capabilities – not just to spread practices so as to build social capital, but to create significant new platforms and assemblages that *fit* (or can be critically-creatively developed), *stick* (and are seen within an ethics of durability and attachment) and *grow* their capability for further successful designing.

When considering sociology's complicity in the recent economic crisis, the *realist* social theorist Margaret Archer has warned of the consequence of ignoring these more sophisticated formations. She argues that Latour's ideas:

> "…collaborated in constituting a context – of institutions and organizations and of general understandings and expectations – that provided fertile ground for the practices that were proximately responsible for the crisis unfolding." (Archer, 2010)

In the terms of my thesis, a sufficiently strong and effective design capability could not be imagined and implemented from Latour's conception of people in the flattened social world of networks:

> "From such models it is not possible to conceptualise a form of political organization (or political philosophy) that would have been resistant to the practices of unrestrained financialization on the part of their rich protagonists or the ready acquiescence of poorer participants." (Archer, 2010)

For the remaking of the University, this could be fatal. But fortunately there is

more to be found in the mouths of the marionettes, who are in reality full of life with minds of their own.

That “speaking back” and “creative abandonment of control” (well known to artists) are essential aspects of *emergent innovation*. Donald Schön describes it in *Educating the Reflective Practitioner:*

> “Their designing is a web of projected moves and discovered consequences and implications, sometimes leading to reconstruction of the initial coherence - a reflective conversation with the materials of a situation.” (Schön, 1986: p. 42)

Aspects that are only now being explained by cognitive scientists - Andy Clark’s work on embedded and distributed cognition is a major advance (Clark, 1997). Clark uses a metaphor for how ideas develop as extended cognitions together in the brain and with materials in the environment: the *mangrove effect*:

> “The mangrove grows from a floating seed which establishes itself in the water, rooting in shallow mud flats…The complex system of aerial roots, however, soon traps floating soil, weeds, and debris. After a time, the accumulation of trapped matter forms a small island. As more time passes, the island grows larger and larger…effectively extending the shoreline out to the trees…land…progressively built by the trees.” (Clark, 1997: p.208)

But we can also learn just as much from reading the notebooks and correspondences of Cezanne, Kandinsky and Klee – for here is the intersection between designing and art. These traits are often observed in professional design practice (they are there in the studies of Cross, 2007; Lawson, 2005; Schön, 1997). My own interviews with and observations of professional designers (architects, web designers, systems designers) confirmed these claims, and illustrated the sophistication and lucidity with which designers speak reflexively and account for instances of emergent inventiveness (where often their narrative accounts become vague – *we sort of just let it happen, in its own time, and it did*).

### *2.2.4 Finding fit and stick (observations in the Media Suite)*

How does a designer get to the point at which they have a *design-in-mind* (mentally or extended into models and plans on paper or in a computer)? How do they get from a fuzzy starting point to something that can be imagined, described and evaluated as a *design-in-use*, and around which we can make predictions concerning the how the design might be experienced? We might call this *creativity* – the passage from the unknown and the imprecise to the concrete. However, to be more precise, and to avoid the conceptual and cultural baggage that comes with that term, design researchers tend to focus upon the production and use of artefacts in designing: specific patterns and tools around which design ideas form and become designs.

In his survey of studies of *How Designers Think* (2005) Bryan Lawson describes the emergence and use of “generative ideas” in the design process

(Lawson, 2005: p.170). This echoes Buchanan's concept of "placements" (Buchanan, 1992: p.12) described above. However, Lawson's term usefully emphasizes the *cognitive* dimension – generative ideas come out of the recognition of constraints and enablements in the materials and tools with which we are working, but they achieve a kind of clarity and cognitive persistence guiding attention and the planning of "moves". It is a simple and familiar concept, but when observed in action its significance becomes clear – and for the study of designing, we can observe different people in different situations using different methods to discover-create and make use of their generative ideas.

As we have seen in Chapter 2.1, designed assemblages are full of ideas – assumptions about the world and things in it, chains of cause and effect, more or less consciously apprehended knowledge of affects, relations to platforms and intersecting platforms, predictions and hopes for the future, concerns and values, doubts and fears – but also sometimes theories about the nature and limitations of knowledge.

A generative idea draws from all of these complexities, but at the same time ignores the detail *so as to get started on the process of designing.* It is sometimes an idea that *if we shape the solution like this, then we can expand its scope or finesse its detail until we have a good solution.* Or sometimes an idea that *if we try this combination out we will learn about the situation and its potential to make a better move later on.* In some cases the generative idea remains there in the end product, sometimes it disappears from view, and sometimes it is discarded along the way. Its importance lies in its ability to

*generate* further ideas, knowledge, experiments and solutions – but also to keep the designer motivated, focused, energized. It is, as such, a powerful *reflexive* tool for self motivation. Lawson tells us that its power lies in its ability to repeatedly propel the designer out of the state of uncertainty and doubt. As such it has a powerful mental presence and influence:

> "The central generative idea may become very important for the designer for whom it becomes like a 'holy grail'." (Lawson, 2005: p.191)

Finding a good generative idea seems as essential as finding food:

> "Unless there is enough power and energy in the generative concept, you will actually not produce a very good result, because there is the three years or so of hard work to go through and the only sustenance, apart from the bonhomie of the people involved, is the quality of the idea, that is the food." (Lawson, 2005: p.91)

In architecture, generative ideas are often found in responding to the constraints and enablements of the physical location, the needs and habits of the intended inhabitants, laws and customs governing constructions, and the construction materials and methods that are available. But architects also bring into a project their own design history – personal styles and ambitions. The generative idea can emerge out of the synthesis of these and many more factors. But Lawson's examples are mostly drawn from architecture. In the design of academic things, there is less immediate clarity and definition to the

constraining and enabling forces. Furthermore, fewer of the academics and students that I have studied at Warwick have such a strong sense of personal style and methodology when it comes to designing for teaching and learning – other than the very basic constraints imposed by conventional teaching spaces, teaching methods, assessment and curriculum structures. Most of the innovations that I have studied begin by radically side-stepping these limitations. The features of new IT systems often provide the source of generative ideas for innovation in teaching and learning. However, in some cases (for example Carol Rutter, as described in 2.1.3), designing is a longer, more persistent project. In these cases a series of generative ideas are explored over time, each perhaps exhausted or proving to be only a partial solution, and then:

> "…'starting again' means looking for a new set of generative ideas around which to build the next onslaught on the problem." (Lawson, 2005: p.197)

In the most successful cases, there seems to be an additional capability, guiding the repeated production and exploration of ideas *without fixating on a single idea for too long*. I argue that is an essential aspect of *designerly reflexivity* – knowing when to switch generative ideas. Lawson tells us that:

> "…the way in which the designer chooses to shift attention from one part of the problem to another is central to the design strategy." (Lawson, 2005: p.197)

Where designers work for commissioning clients, as is usually the case with architects, generative ideas can help to establish and sustain the relationship – although there are dangers in seeming to give too much of a concrete idea of the end design too early in the process. This leads to many complexities in the relationship between architect and client (Lawson, 2005: p.183). In design projects where the brief is not clearly worked out in advance, or where it is left open so as to enable innovations to emerge, generative ideas are often the product of wider participations. An approach to designing called *participatory design* provides strategies and techniques to support the collaborative and emergent production of the brief and design ideas from a wider collaboration (Robertson and Simonsen, 2012). *Empathic design* has similar ends in mind, but starts from the admission that effective participation is not always possible, and to effectively create briefs and design ideas designers need to understand the minds of end users (Leonard and Rayport, 1997). The IDEO Design Thinking strategy combines many of these practices, with the aim of creating briefs and design ideas from "…insight, empathy and observation" (Brown, 2009: KL 518). Tim Brown defines one of Design Thinking's key aims as establishing a capability for doing this with much larger scale collaborations.

> "The movement from insight to empathy leads us, finally, to the most intriguing question of them all: if cultures are so diverse and if the twentieth-century image of "the unruly mob" has given way to the twenty-first-century discovery of "the wisdom of the crowds", how can we tap the collective intelligence to unleash the full power of design thinking?" (*ibid.* KL 741)

The IDEO approach will be examined further in Chapter 2.5. For now, we can return to the role of generative ideas and the designer's (varying) handling of them in the University, which is currently typified by much smaller collaborations, or even sole designers acting on their own in a way that might best be described as *ad hoc.*

### *Is Theatre Studies the most designerly of our disciplines?*

Of all of the design-like activity that I have observed at Warwick, some of the most sophisticated has been seen amongst Theatre Studies students – perhaps the most designerly of the disciplines taught.

Using my Media Suite at Milburn House (next to Theatre Studies) as a base, I was able to observe Theatre Studies students developing ideas into designs. They would go through all of the typical periods of vagueness, playing with elements in various combinations, searching, describing, diagramming, testing out prototypes etc. Ideas would emerge and get refined. And I could see designs building towards completion over time. The most memorable of these cases for me is *Theory Roulette* by Catherine Allen and Lauren Cameron (second year undergraduates at the time). This was an assessed performance-installation. It emerged as a way of making the Chat Roulette system of randomised chat room encounters more concrete and visible. A projected map of the locations of participants was displayed onto a screen in the black theatre studio (with the lights down). A spiral of MacBooks hung from the ceiling, each playing a video recording of a chat roulette session. The end product seemed to emerge as a generative idea once that Ian

O'Donoghue (Theatre Studies technician) had suggested a means for safely suspending the MacBooks (and I had agreed to accept the risk). A prototype was assembled in the Media Suite and the video edit and final construction emerged around that. When described in this way it sounds all too straightforward. It was neither that simple nor predictable at the outset.

*The spiral of MacBooks in Theory Roulette.*

Theatre Studies students seem especially good at finding and following generative ideas. As I discovered when I interviewed Nadine Holdsworth (head of the School of Theatre and Performance Studies), the School, its curricula, and its everyday practices are set up in just the right way:

- Students get a continual stream of opportunities to create original responses to briefs, and to come up with their own briefs (with an emphasis on collaboration). These range from small, immediate events to much bigger, longer projects (all the way up to performing at international festivals like the Edinburgh Fringe). They are assessed for the design of their performances and their reflections on its design.
- Practice, critique and theory (with a philosophical aspect) are

continually interconnected – performance is there as an exploratory, experimental method for theory and research, theory works to make practice better and to take it to new possibilities.

- A range of spaces are used for teaching, including theatre studios and large re-configurable seminar rooms. Students are able to occupy spaces for lengths of time necessary to design and construct bigger performances and installations. The spaces are backed-up with a well-stocked store of equipment and materials. Their use is supported by a dedicated full-time theatre technician – Ian O'Donoghue, a continually inventive and enthusiastic theatre professional.
- Academics *visibly* interact with each other and show a shared sense of what the school is about. Performances are assessed by academics from outside of assessed module's teaching team – in some cases, I was invited to help with assessment. This establishes a legitimacy to student work – it is part of the wider Theatre Studies culture, not just the module, and gives the student an opportunity for wider feedback and to build a personal reputation based upon their designs.

All of these factors and more work together to help the students to become creators-discovers of good *generative ideas*, and to be effective at following-developing their ideas along into well designed end products.

### *Participant observations in the Media Suite*

Theatre Studies provides my best examples of *designerly* practices in the curriculum – it is very much built into everything that they do. But what about other students and staff from other disciplines? The Media Suite proved to be

a great place to observe the emergence of generative ideas, and how different people would work with them in different ways. There was a remarkable degree of uniformity amongst the response to the Suite and the film making approach we used – the school students of IGGY responded in the same ways as the more elderly academics. But that uniformity was a product of the quality of the technologies and a simple but effective film making approach. A very small number of the Suite's users had prior experience of more sophisticated edit tools (Premiere, Final Cut Pro). But in all but one of these cases they responded positively to the Media Suite ethos putting simplicity-first. Many others had experienced Microsoft's editing software, and were consequently delighted by the Apple alternative.

The most significant difference, however, was in the use of the facility by the Arts E-Squad students and the SIBE social-enterprise (with Politics students playing a key part). In many cases the Media Suite remained an isolated experience, with little direct impact upon other academic practices. But with the E-Squad and SIBE it connected directly with academic ways, projects and values to produce a new synthesis – thus indicating ways in which it might remake the University differently.

This is a brief description of the Media Suite, the approach that I used, and some of the interesting differences in how people responded to it.

The iMac/iMovie setup was chosen because of the way in which it gives a maximum of creative control with a minimum of training and technical ability. It renders video fast, and allows for experimentation and creative accidents.

Most importantly, footage is imported and reviewed with very little delay. Fresh footage and voiceovers may be recorded directly into the Mac through a good-enough quality camera (iSight) and microphone. iMovie is an example of an important kind of digital production and distribution platform[78] - enabling the rapid and seamless transition from prototypes to finished product, without the need to first create abstract plans and diagrams. Generative ideas are found in the materials, and worked-up into satisfactory productions. With the loan equipment close at hand, additional footage could be created as the need became apparent. The speed with which footage may be reviewed and rough prototypes produced means that people can share their ideas more freely. This often happened between strangers working on different projects. In this way a design-in-mind could be tested out quickly with an audience, to observe the design-in-use and to get a sense of the design-as-experienced.

On many occasions, after giving only the briefest of introductions to the software, I could sit back and watch movies, and more importantly generative ideas, emerge through the creative dialectic of the designerly conversation with materials and situations. I was looking for the "mangrove effect" (Clark, 1997) in which an idea takes root and gathers further elaborations around it until it takes on the form of a permanent kind of solid ground. I wanted to see people finding and exploiting f*ortuitous complexities* of this kind through the application of *designerly reflexivity* – the mechanisms of emergent inventiveness around which my theory of designing is constructed (and which will be unpacked later in this chapter).

[78] Through its easy connection to distribution channels like YouTube.

In the Media Suite I was able to watch as people got hold of generative ideas, discussing and refining them together (working through disagreements and misunderstandings), and worked them up into finished movies. Often this would be accompanied by obvious physical changes in behaviour – a sudden intensification of attention and action, sometimes accompanied with sounds of delight and a change in conversational tone.

The Media Suite allowed me to observe varying degrees of success and factors in successfully finding and using generative ideas. Three factors recurred:

- A willingness to just dive in and experiment (the specific software and hardware enabled this, but some people would struggle with the idea that edits could be made and undone so freely).
- An ability to identify, describe, communicate and build upon generative ideas – where people can create a range of ideas for consideration, and then quickly choose one to try, the end products were better, but this was often constrained by an ability to describe ideas effectively (storyboarding makes a big difference).
- An ability to quickly drop an idea that is not working and start again, but also to learn from each case.

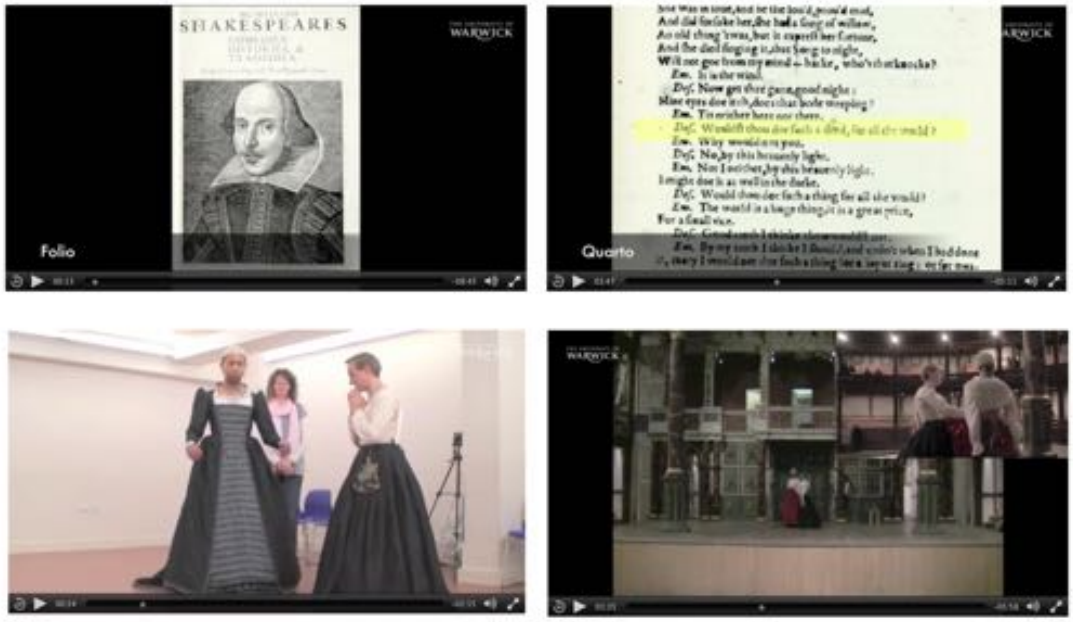
This is very much akin to the approaches described by Ed Catmull (co-founder of world-leading animation studio Pixar) in his book *Creativity Inc.* (2014).[79]

On many occasions I asked the question – how similar is this to other creative activities more at home in academia, for example essay writing? Students who had been through the Media Suite film making process as part of academic modules (for example Renske Doorenspleet's *What, Why Democracy?* project in which the students produced films and essays) were able to compare the two kinds of project more directly, and could identify the same processes (the finding and working through of generative ideas) and the same factors in success (especially the importance of having a range of possibilities, but also of discarding bad ideas quickly and efficiently). Other students described essay writing as a more mechanistic process, almost like completing a template.

Often, activities in the Media Suite would allow the editors to view events and academic ideas in completely new ways. One of the most interesting of these cases involved Carol Rutter (CAPITAL Co-Director at the time, and celebrated Shakespeare Professor). Carol had taken a group of students and three actors to work on the Quarto and First Folio texts of Othello at the Globe Theatre in London. Their project was called *Unpinning Desdemona*. During their visit, they experimented with the different versions of the text (Quarto and First Folio), with different types of costume, and in the Globe's three

[79] And it was not surprising that Catherine Allen, one of the best users of the Media Suite, went on to work for Touch Press, a company that follows the Pixar approach.

spaces (two rehearsal rooms and the theatre itself). They filmed these experiments, and later, Carol and Jon Trenchard (actor) spent a day sitting in the Writers' Room at Warwick in front of an iMac with the footage loaded into iMovie.




*Images from Unpinning Desdemona the Movie, by Carol Rutter and Jon Trenchard.*

For editing, I moved an iMac into the Writers' Room, on a table in front of a sofa. This proved to be a more comfortable and familiar environment in which they could work. It also provided better sound quality than the harsh sounding Media Suite. As Carol and Jon created their video, I revisited them on several occasions to watch the movie emerge through their *building to think* (Kelley, 2001), channelled through their experiments and reflexive engagement with the raw footage and the emerging storylines.[80]

[80] The resulting Unpinning Desdemona videos, and an interview with Carol and Jon, are available on the CAPITAL Centre web site at http://www2.warwick.ac.uk/fac/cross_fac/capital/teaching_and_learning/projects/unpinning/

They found their generative ideas and, through a reflexive conversation, found their ways to work together effectively through the film making platform. Their series of movies developed around a combination of the footage that they filmed at the Globe, the voiceover that emerged from their conversations during editing, and images of the texts from the Quarto and First Folio editions. I had photographed the texts and added highlighting and animations (zooming in and around the texts) for them as their ideas developed.

*Carol Rutter & Jon Trenchard editing Unpinning Desdemona, Writers' Room, June 2010.*

### *Designing: absorbed in creativity and reflexivity*

In cases like this we can *sometimes* see two things happening, two dimensions of action:

> The *design-in-mind* takes-off and achieves a clarity and momentum, accelerated and intensified by seeing the *design-in-use* as quickly as possible and getting a sense of how it will become *design-as-experienced* from the perspective of the viewer/end-user. As the designer Tom Kelley (of IDEO) says: "prototyping is the shorthand of design" (Kelley, 2001). Systems like iMovie allow us to move from "lo-fi

prototyping" (Kelley's term) getting feedback quickly (from others or from our own critical perspective) through to "hi-fi prototyping" and to an end-product.

The designers take a reflexive step back from what they are doing, to consider their own methods, assumptions, progress etc. This is what I earlier called a *critical-creative interruption*. It might happen as an emergent product of the creative process, as ideas hit difficulties or fail to work out. Or it might be engineered by people themselves. I noticed a kind of rhythm in the work of the most successful users of the Media Suite, moving between periods of absorption and intense focus, and moments of "stepping-back" or even just becoming (semi-deliberately) distracted - cigarettes, coffee, Twitter moments. This concurs with observations made by Cathy Davidson for her book *Now You See It* (2011). Davidson observed this kind of rhythm with successful people in all kinds of fields, including academia.

These two dimensions work best when in balance – on the one hand we get absorbed and carried-along by the generative idea, and on the other hand our *designerly reflexivity* pulls us out of the trance and adds the critical-creative edge – not just critical of the generative idea and its development into a design, but also of the methods and assumptions that we are using. It is especially effective where the reflexive mode works to question the generative idea and the emerging design from perspectives other than our own – from that of an audience or end-users: *empathy*.

But it is never easy. Opposing forces pushed and pulled the film makers in the Media Suite, often turning what at first might have seemed a simple idea into a long and hard struggle. With many of the technical barriers moved, I could see theses creative and intellectual struggles coming to the fore. This was especially obvious in the case of Renske Doorenspleet's Politics and International Studies students. Their brief was deliberately open (or experienced as a vagueness). The small film making groups (two or three students) were clearly not used to working together in this way (and that was part of Renske's aims, to expose them to a less individualistic mode). Not only did each team have to make sense of and shape the brief into something that would make sense to them and a supposed audience, they had to work together to establish *who they were* as a collaboration and who the audience should be. There is in this a kind of *wicked problem* – the activity and its assessment only makes sense when these things are well defined, but defining them is part of the activity that the students have to undertake – which from the student perspective often appeared baffling, counter to the expected rules of the educational game, and to a small degree *threatening*.

As was usually the case where the use of the Media Suite was integrated into assessed module activities, I personally had great respect for these brave students – they could have taken a safer route, but instead chose to push the boundaries, to take risks. In effect, the students were signing up to something that could redefine the nature and purpose of higher education at Warwick. And remarkably I discovered that in many cases the students were aware of this *liminality* and keenly contributed. They were, of course, a self-selected group. The academics I worked with on Media Suite projects, including

Renske, were always clear about the experimental and even revolutionary nature of their work. This is clearly signalled to the students, who then sign up to modules that are notably different to the others on offer. Where modules are pitched in options fares (as in English) academics will go out of their way to emphasise these differences. There is, to some extent, a market in operation. And the students are consequently self-selected. But even in the case of the compulsory film making and web development activities that have been added to the core Making History module (in History), many students embrace the riskiness, and themselves use it as an opportunity, or license, to experiment (although Making History is a first year module that does not contribute directly to the final mark).

### *Risky options and the character of designing in the University*

Why would they do that? Why do some students sign up for risky modules and dissertation topics that rely so heavily on the creative process and have such a strong element of unpredictability? A leap of faith? Naivety? Similarly, why do some academics embrace risk in teaching and learning? Why, given the small rewards on offer (in terms of career prospects) and opportunity lost (for research time) do they undertake the often difficult and time-consuming projects encountered in my research? When I have asked the students and the academics, the response has most often been along the lines of: *it just seems to be an obvious thing to do*. By then, already into the projects or having thought enough about them to get started (and contact me), they are already well-engaged with what they are doing.

These are of course more complex questions. But my observations and interviews in and around the Media Suite pointed to something very

interesting from the designerly perspective – demonstrating a connection between designerly ways of thinking and the [re]making of the University through liminal activities. The importance of this cannot be understated. As was shown in Part One, the University is in a state of flux, its history and its future are contended and feel incomplete – the idea of the University, especially at this time (still working through the post-Browne reforms) is unclear, to the outside world, to students, to academics and to its leaders. The physical environment is being *adaptively reused* all the time. This has always been part of the Warwick way of doing things. The design history of the place, its rapid growth and fast-changing form, have established an ethic of invention and *ad hocism*.

If we survey the activities that are taken in the representations by its official agencies of change as examples of what Warwick does, then we see an emphasis on innovation rather than a pride in regularity – no one talks about the processing power of the administrative functions, we only hear about innovative physical, intellectual and online spaces and practices (the focus of the regular Teaching and Learning Showcase events is always on diversity and innovation). But students have a skewed view on this - given the amount of time that they have to assimilate and operate within an established culture (even in a three year degree) that is not surprising. There is, as I discovered, very little knowledge of the design history of the place. Very little tradition to hold people back. All is new and there to be made afresh. There is at the same time a strong sense of direction, of a compulsive flow of events in a kind of process funnel towards graduation, and for some, a self-reflexive existential imperative in that short time to make something more than the final

grade. The paradoxical sense of existential *being there*, *going somewhere* and *uncertainty* is nicely expressed by this Talking Heads lyric:

> Well we know where we're goin'
> But we don't know where we've been
> And we know what we're knowin'
> But we can't say what we've seen
> And we're not little children
> And we know what we want
> And the future is certain
> Give us time to work it out
> "Road to Nowhere", David Byrne (Talking Heads), 1985.

And at the same time innovative projects like those based in the Media Suite are *showcased* as *what the University is about* and *how the future of the University gets made.* For some people this is all just confusing. Sometimes students respond to the openness of these innovation spaces with a kind of frustration: *just tell me what I need to do and I will do it.* The few occasions on which such sentiments have been expressed in the Media Suite probably represents a much larger proportion of students, outside of the relatively self-selected group of students that the Suite attracted. But the voices of those who are prepared to take more risks are disproportionately represented in the dialogue over the future shape of the University. There is no clear, settled, structural reality to this. It is paradoxical, presenting itself to staff and students alike as a wicked problem.

### *Early recognition of generative ideas trumps student strategizing*

As we have seen with the History and Medical curriculums, the *design-in-mind* of the *curriculum-as-intended* may be (often is) deliberately open to interpretation. The aim is to provide sufficient opportunities, and to co-develop with the student their capability for making something concrete out of the design for themselves, unique to each student. From the student's perspective, that design task might require the kind of "functional-rational" reasoning that knows and deals with essential and accidental complexities. Does this contribute to student success in terms of degree classification? Does it enable a student to construct a pathway through the curriculum that gives them the best possible chance of a first class score? Whenever possible, I have asked this question of successful graduates that I have met through my work. The answer has been: partly, but it isn't the whole story. However, we can often find a *strategic* way of thinking at work, and it is hard to tell from the biased recollections of a graduate how they *really* achieved what they did.

The selection of recollections included in the book *How I Got My First Class Degree* contains many interesting insights that seem to be authentic and honest (Tolmie *et al.*, 1998). Mark McArdle (First Class Honours in Management, Lancaster University) for example, tell us that:

> "You have to get a feel for the education market and really sell your inspirations. What does the lecturer want? What is the essay marker searching for? What is the examiner expecting?" (Tolmie, 1998: p.18)

The functional reasoning of the market – identify precisely what the customer wants, and give it to them in the most compelling and efficient way. He goes on to tell us how he got his First:

> "If you choose wisely and get the quality right, you stand a good chance of producing outstanding results." (*ibid.* p.18)

But in the Media Suite, and in my interviews and observations, I found a more sophisticated way of thinking. In the case of Carol Rutter's Shakespeare "without chairs" the choice for the students was much more difficult, as one student (who would go on to get a first and study for a PhD) told me:

> "It was a big risk, we knew that when we signed-up. But we also knew how great it might be if it worked. And that depended so much on the other students. But Carol made it work. She is like that, her personality. You have no choice. Right from the moment you walk in it is full-on and non-stop. And you never know if she will choose you to do something. Except that you know she will. But did I know what would come out of it? No, not at all. I did think something would, but I couldn't be sure what. It was a risk." (English Department Student, interviewed 2011)

In conventional academic terms, there was no clear picture in advance of "what would come out of it" – a grade, a gain in capability? But as a design idea, every student I interviewed claimed to have a clear picture in advance of without chairs as a designed experience, as an assemblage of the space,

movement, intellectual and physical materials, bodies etc. The design was much more clearly perceived and remembered, and identified as something capable of generating an interesting and desirable output. Without chairs is as such a classic generative idea, a *placement* that enframes Shakespeare and learning in a different way for different affects and consequences. The same seems to be the case with students and academics on other risky pathways. Although the end result is not always clear, and may only take shape late in the process, very early on they have a clear perception of some aspect of what they are doing that will act to carry them forwards and sustain the innovative activity. In this way, the generative idea may trump the desire for certainty in otherwise rational-strategic thinking. It starts with a sufficient degree of good fit on some dimensions (the academic, the topic, the fellow students, the location, the style) and through co-adaptation with the design-in-action, develops a deeper sense of fit, producing something that endures over time (beyond graduation). It is *emotionally durable* in Jonathan Chapman's sense. And that, I argue, is an essential characteristic in the designerly behaviour through which people in the University are creating new practices and new norms, remaking the University.

### *SIBE – generative ideas for re-designing the University as a platform*

The SIBE student film making and social innovation organisation originally spun-out from Renske Doorenspleet's Politics and International Studies (PAIS) student film making. Her second year module *Core Issues in Comparative Politics* became an experiment in bringing the study of politics closer to the practice of politics *through trans-national social media and film making*. After studying on Renske's module, a group of PAIS students, galvanised by Sholi Loewenthal, took up my open offer to use the Media

Suite for independent student projects. They established SIBE with no other formal support from the University, spending their own funds, and committing a significant amount of time. In an interview that I conducted with Sholi in the summer of 2013[81], he described SIBE as:

> "A student media organisation which puts students in the driving seat, to create media, to allow students to engage with the wider world."

From the outset, SIBE was conceived not as a provider of career opportunities, or as a technical-creative experiment, but as an agentic engagement with the world beyond the campus bubble. The SIBE founders began with a clear idea of where they wanted it to go, and how it might change the nature of higher education, and specifically, the role of students:

> "It's not about students creating media for themselves, it is about students creating media for the wider public. SIBE is also, as its key mission, in terms of the media it produces, trying to encourage constructive action."

And Sholi does mean "constructive" in both sense: making things, making change, and making positive difference.

> "It kind of two-folds that idea of students as producers. Students as producers guiding and leading and creating the expositions in news, in journalistic value."

[81] Available online at https://www.youtube.com/watch?v=vcmj9QP_CDw

That is, producer as in media producer.

> "And then it is about students being producers in terms of taking those ideas, and allowing those ideas to take root, to seed, to develop, and to grow."

And producer as in making projects and designed things that create positive change.

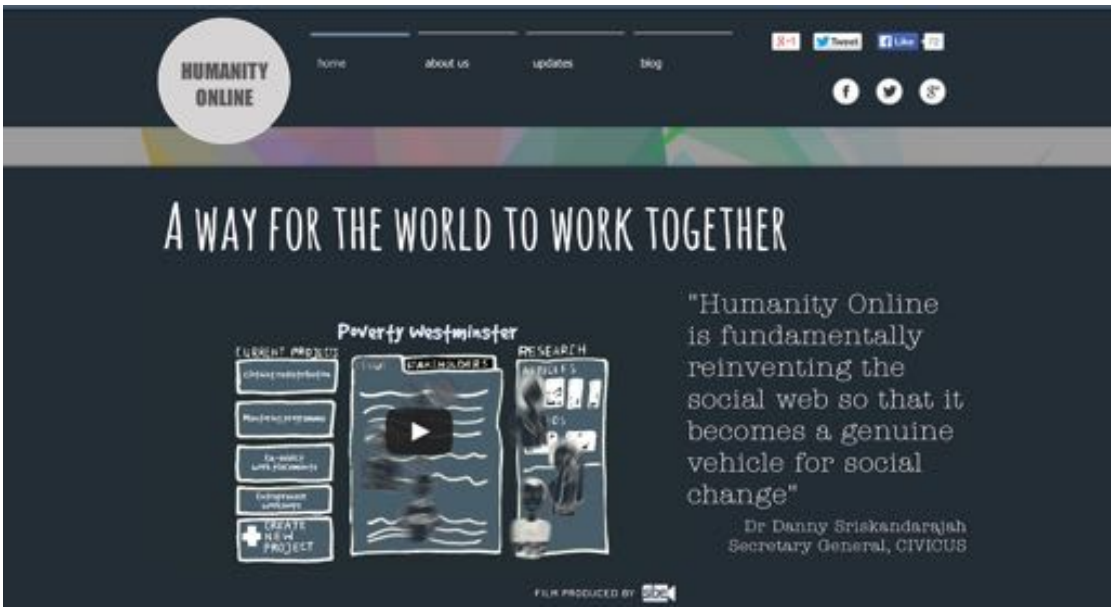
> "And what we do in SIBE is bring those actions back into the journalistic process, where we explore them, and expose them, and raise questions about the value that they are contributing as solutions. And thereby what we are trying to do is always constantly provide an innovation space."

As is clear in this interview, Sholi's actions are based upon much reflection and reflexivity, and out of that, theorising about the world, his own agency and that of his fellow students – within the context of the organisation SIBE (which developed a life of its own). But that is not just talk. Over time I watched them experiment with formats, creating a live online broadcasting channel with distinct programmes, documentaries, events, projects and an extended network with a SIBE style and a SIBE methodology. This emerged as a *designerly conversation* with the available resources and through their individual and collective reflexivity – even as the organisation grew and spread into different areas of media and social innovation. And in turn, this

started to change the space in which SIBE operated, creating new common grounds for student agency:

> "The Breakout is a production which aims to create an environment or space or a discussion space where innovative and socially 'disruptive' ideas can be explored and then possibly launched."

This eventually grew into an online platform for bringing together related social innovation projects across the globe (SIBE already had many links in other countries, but not a suitable platform): *Humanity Online*.




*The Humanity Online platform, August 2014. http://www.humanityonline.org*

The design and construction of the *Humanity Online* platform is directed and funded independently by Sholi Loewenthal and his team, now entirely independent of the University of Warwick. On the site they state that:

> "Humanity Online aims to harness a connected and multi-stakeholder approach to addressing local, regional or global issues - whether

social, economic or environmental. To facilitate this, Humanity Online is developing engage.re: an online platform for collaborations where users are able to come together as communities in order to achieve greater impact in solving problems of mutual concern. All Humanity Online activities are geared towards the betterment of our local and global communities."


*From the Humanity Online web site.*

Over a very short time, SIBE became a significantly well established and designed organisation with its own ecosystem of roles and ideas – following the same kind of pattern that I encountered with the Arts Faculty E-Squad. **It was a kind of well organised craft collective with the Media Suite as its workshop and reflective practicum. And through this there emerged an ethical understanding, with a commitment to *developing design capability* and *spreading design ideas.* This marks-out SIBE as significantly different from the ongoing background of everyday designing that I observed in the Media Suite.**

In June 2013 I interviewed one of SIBE's film editors. She told me how the SIBE experience, and the discussions that occur when working through a project, created an enhanced ethical understanding of the world and the role of the media:

> "…editing is really powerful, in the sense that you can pretty much lie with it, even though you're taking from fact. I can manipulate the world. When you see all the programmes on at the moment, where they have the video tapes and if they want someone to be negative they'll take the one minute of the whole day where they have said something bad."

And SIBE will, of course, not do that. They edit with a conscience, backed up by an ethical stance, always guided by shared values and concerns that shape the reflexive conversation.

A craft collective, a creative industries style network, with explicit shared *design values* and practices, making the most of affordances and constraints of the opportunities that are available, but also working on a long term strategy to expand their (design) capabilities.

Behind these ideas lies a revitalisation of the role of agencies (in the plural) in higher education, including forms of student agency. Not simply as a means to ensure stakeholder buy-in for the institution's strategic project. Rather, as taking the development of agencies as an end in itself for higher education. That connects with my student self, looking forwards into the prospect of constructing my agency. It connects in a different way with my present self,

thinking about how my agency contributes to making the University. But what does this mean? How is agency constructed (in higher education and elsewhere)? What does agency do? In what different ways can it make new, different things? In what way is higher education made by the agency that it constructs? To give life to the proposed new constructionism, this vague notion needs to be made concrete.

### *2.2.5 Designerly reflexives creating spread and grow*

There was, it must be said, still a significant gap between the design activities that I observed in the Media Suite and those of more organised and experienced professional designers. Theatre Studies students often proved to be the most designerly and reflexive *in relation to their disciplines and formal curriculum*. Many, if not most of the participants I observed exhibited a powerful desire and well-developed capability for producing designs that fit with their practices, projects, values and concerns. This occurred through a combination of experimentation and prototyping, empathic designing, participatory designing, creative-critical practice, and reflective deliberation and considerations played-out in official and *ad hoc* collaborations (often involving my input). In fact I observed practices similar to all of those described by Lawson, Cross and Schön – although opportunities for building large-scale sketches and plans, developing prototypes, realistic experiments and very inclusive design participations were limited by facilities (very little space being available in which projects could be persisted over time), skills (especially sketching and diagramming) and opportunity.

In a few cases, however, students made extra effort to create *spreadable* designs and design ideas (carrying values and practices along with them) and

to actively *grow* their own design capabilities. The Arts E-Squad and SIBE being prime examples. There was, amongst these groups of students, a much more developed *designerly reflexivity* – recognizing the value of *spread* and *grow.* Whereas in my interviews with academic staff, even those identified as innovators, I had not identified much in the way of *design pattern* recognition and communication (with design cases and ideas being abstracted into patterns), with these students I could easily engage in a conversation in which pattern-like ideas would be exchanged, assessed and refined.

Why should this be the case? What makes the difference in these cases?

Margaret Archer's research into "modes of reflexivity" and personal-social development provides some insights – although a thorough exploration is beyond the scope of this project.

In *Making Our Way Through the World: Human Reflexivity and Social Mobility,* Margaret Archer presents a *realist* account of human agents with a powerful and effective reflexive ability capable of genuine originality:

> "…reflexive ability to design (and redesign) many of the projects they pursue." (Archer, 2007: KL 116)

The word is "design". But is that the commonplace use of the term, interchangeable with "choosing", "constructing", "planning"? Or something more precise – more akin with the practices of professional designers? In an endnote she cites Walter Buckley's *Sociology and Modern Systems Theory* (1967) as the source from which she takes her key ideas of *morphogenesis*

(the process of change) and *morphostasis* (Archer, 2007: KL 4967). Buckley was a critic of Tarde. A systems theorist from the same milieu as Herbert Simon, but with an interest in the openness of systems involving the human capability for emergent inventiveness. Buckley's account of the genesis of organization through *morphogenesis* is informed by, but not limited to, pragmatist developments of empiricism – the "process view of Dewey and Mead" (Buckley, 1967: p.94). Most importantly, Buckley sees in pragmatism a more sophisticated awareness of the complex *dynamics* of thought and experience (as opposed, for example, to behaviourism):

> "We do not find a mechanical stimulus-response relation, but a complex ongoing "act" within which the individual is an active agent with degrees of freedom, selectivity, or innovation mediating between external influences and overt behaviour." (*ibid.* p.94-95)

Buckley situates his own work within a trend that sees "modern information theory" moving away from the "hard-headed" behaviourist camp (*ibid.* p.95). In the fourth section of *Sociology and Modern Systems Theory*, pragmatist and related approaches are examined in search of the missing "theories and frameworks" necessary for applying systems theory to humans and society. The shift is from a view of humans as passive and pre-programmed towards a notion of humans as responding, creating and shaping the world through theories and tools – what Dewey calls (in *Experience and Education*):

> "…a potent instrumentality for dealing effectively with the future" (Dewey, 1938/1997: p.23)

Significantly, these *instruments of experience* are *future-oriented*, looking beyond the present, envisioning a future and how to get there *by design*. They are, in the terms of my research, the instruments of designerly agency and reflexivity. In Archer's framework for morphogenesis, developed from Buckley, the instruments are our *practices*, *projects*, *concerns* (positive and negative) – and an essential aspect of our practices, for formulating projects to address our concerns, is *reflexivity*, or "inner conversation" (although the inner-ness of reflexivity varies).

Internal conversations are shown, through the case studies in *Making our Way through the World,* to be formally structured in a way that varies between individuals, but with some commonality. Archer finds four such common forms of internal conversation, presented in this table (reproduced from Archer, 2007: p.93):

| | |
|---|---|
| *Communicative reflexives:* | Those whose internal conversations require completion and confirmation by others before resulting in courses of action. |
| *Autonomous reflexives:* | Those who sustain self-contained internal conversations, leading directly to action. |
| *Meta-reflexives:* | Those who are critically reflexive about their own internal conversations and critical about effective action in society. |
| *Fractured reflexives:* | Those whose internal conversations intensify their distress and disorientation rather than leading to purposeful courses of action. |

Each of these modes sees their practitioners responding to, making sense of, and formulating plans to change the world in different ways – except the *fractured reflexives*, for whom change seems impossible. In the third volume

in the series, *The Reflexive Imperative in Late Modernity* (2012) Archer applied the same methodology and conceptual framework to the cases of undergraduate students at Warwick – with obvious relevance to interpreting the reflexive commitments and methods of groups like SIBE and the E-Squad. She argues that modernity has seen a shift from *communicative reflexives* embedded in unchanging traditional societies, to *autonomous reflexives*. These more individualistic types are career-oriented, determined planners and self-monitors, aiming for personal progression in a world cut off from the certainties of kin-ship and community:

> "…self-contained internal conversations, leading directly to action" (Archer, 2007: p.93).

That certainly describes some of the people in my study – I could tentatively say that some of the academics and students seem like this, and perhaps that reduces their interest in spreading and growing design capability, in favour of an instrumentalist *ad hocist* hurdling to just get things done. Or when necessary, a more complex form of strategizing. For students that might mean the methods documented in Tolmie's *How I Got my First Class Degree* (1998). For academics it might translate into the kinds of attitudes and behaviours documented by Becher and Trowler in *Academic Tribes and Territories* (2001).

There is certainly some truth in this, visible in some of the kinds of designing that I have observed outside of the Media Suite. For example, the design of departmental web sites acts as a proxy for territorial and strategic thinking. At

Warwick web sites are constructed in the familiar “browser tree” navigation pattern, implying a hierarchy of home page, sub pages (some of which appear as subsections) and sub-sub pages (iteratively, sometimes drilling far down into the dark depths of accumulated additions). Departmental sites sit inside of faculty sites. Research team, projects, taught programmes, modules, personal portfolios, all sit within the hierarchy – more or less near to the top level. The structure and content of sites is usually devolved to the groups of people they represent – although in some cases that means an local administrator. The Sitebuilder web publishing system through which this work is done (an in-house development) is known to almost every member of staff (with around 3000 distinct editors a month). The overall visual design for sites is created by a graphic designer (usually the IT Services in-house designer). This all leaves lots of scope for people to create their own messages – explicitly or as encoded into the structures of the sites. And that sometimes means long, potentially conflictual discussions about who goes where and what that means.

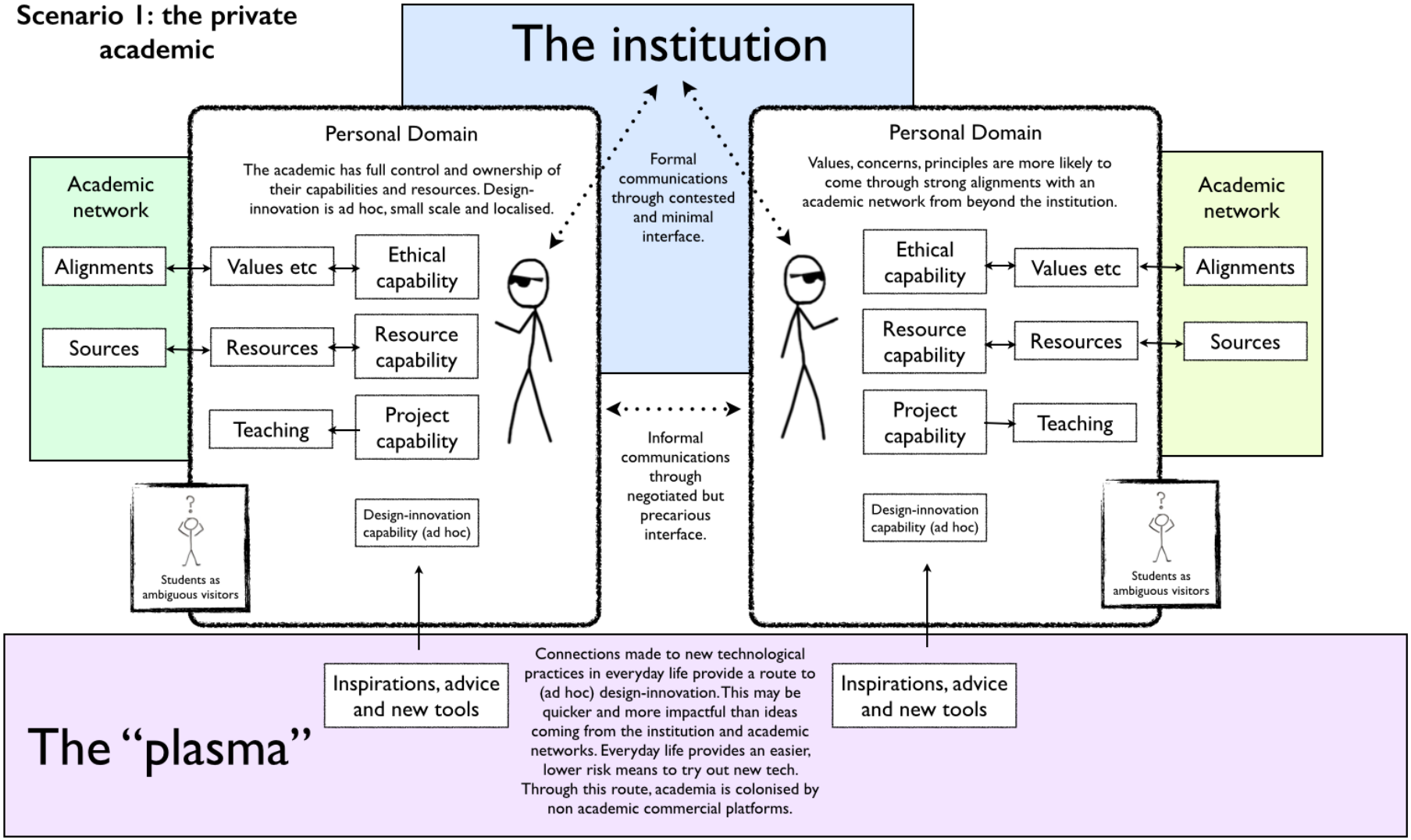
Designing the web site then becomes a proxy for designing the department. I have listened to many of these conversations. My colleagues at IT Services know them well. But in the terms of this thesis, I can add a fresh insight: the web site is a *reflective practicum* in which people learn to make academia, it is a place in which hypotheses are developed and tested out. In thinking about how this has changed Warwick, I produced a series of diagrams. In the first of these “scenarios” academics work as semi-private agents loosely connected to the institution (diagrams in the following pages). The resources they use in research and teaching largely exist outside of the institution, and

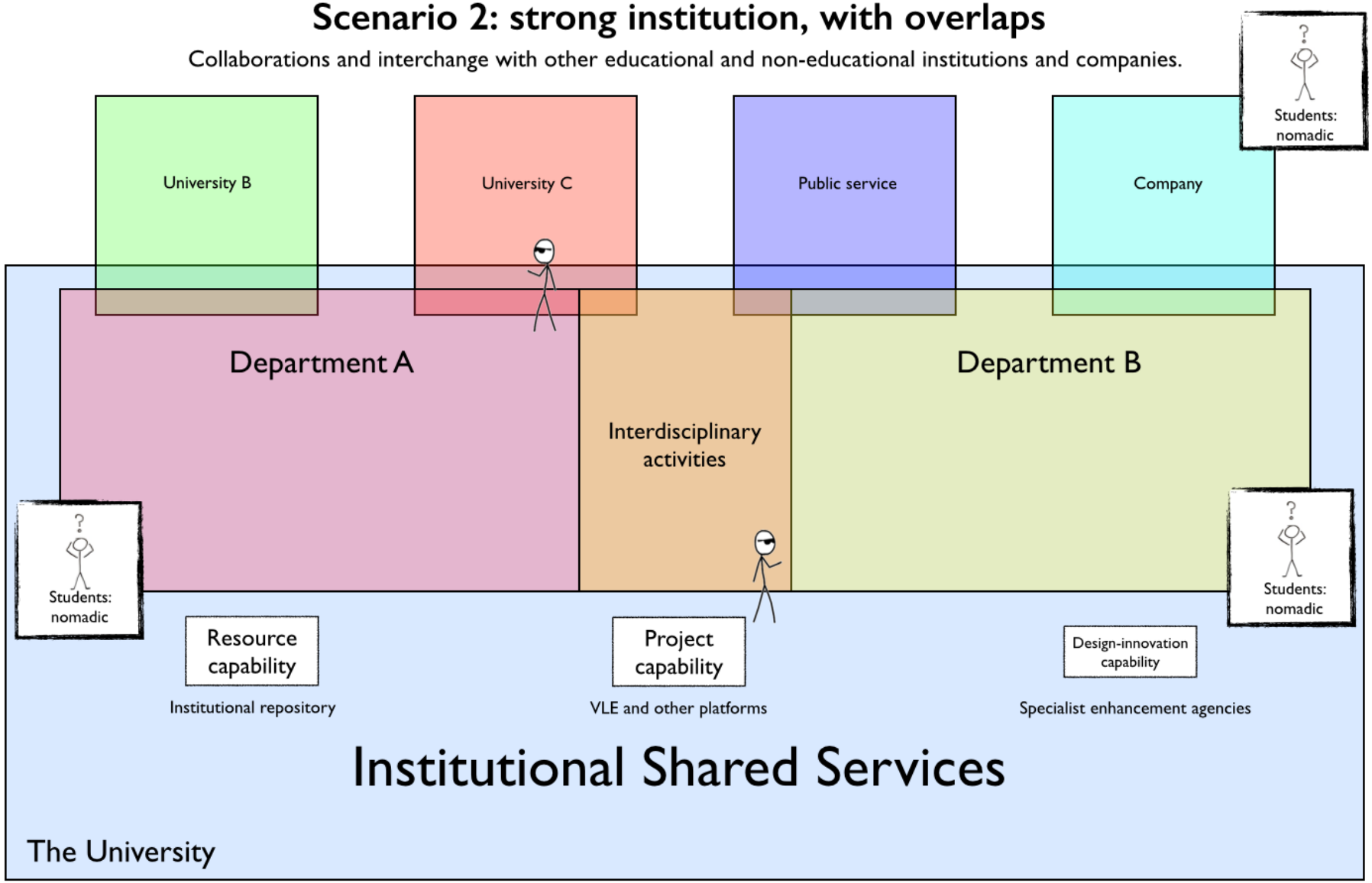
are accessed through extra-institutional networks. The “ethical capability” through which they define, refine, apply and assess values also comes through these external networks. Relations between academic tribes and territories are “informal communications through negotiated but precarious interfaces”. Formal communications with the institution, for example concerning programme and module design, organisational structures and teaching facilities, happen through a “contested and minimal interface” – for example, in Warwick’s case, module approval forms (still on paper in 2014). The implications of this situation are that: design innovation capabilities are underdeveloped, largely *ad hoc*; students experience their position within these cultures as “ambiguous visitors” – rootless, unless they can connect themselves closely to an academic and access the external networks through which power and opportunity are channelled.

Scenario 2 represents a very different situation, with a much more dominant single institution. This also has its negative consequences. There might be a loss of distinct local identity, for example with disciplines merging into one indistinguishable modularised system. In this case, students might feel too “nomadic” – although some will be able to make the most of it through their own designerly capabilities. Design capability might also be very much out of the hands of most academics – except where they can hack the platform, or be prepared to risk using unofficial platforms outside of the institution.

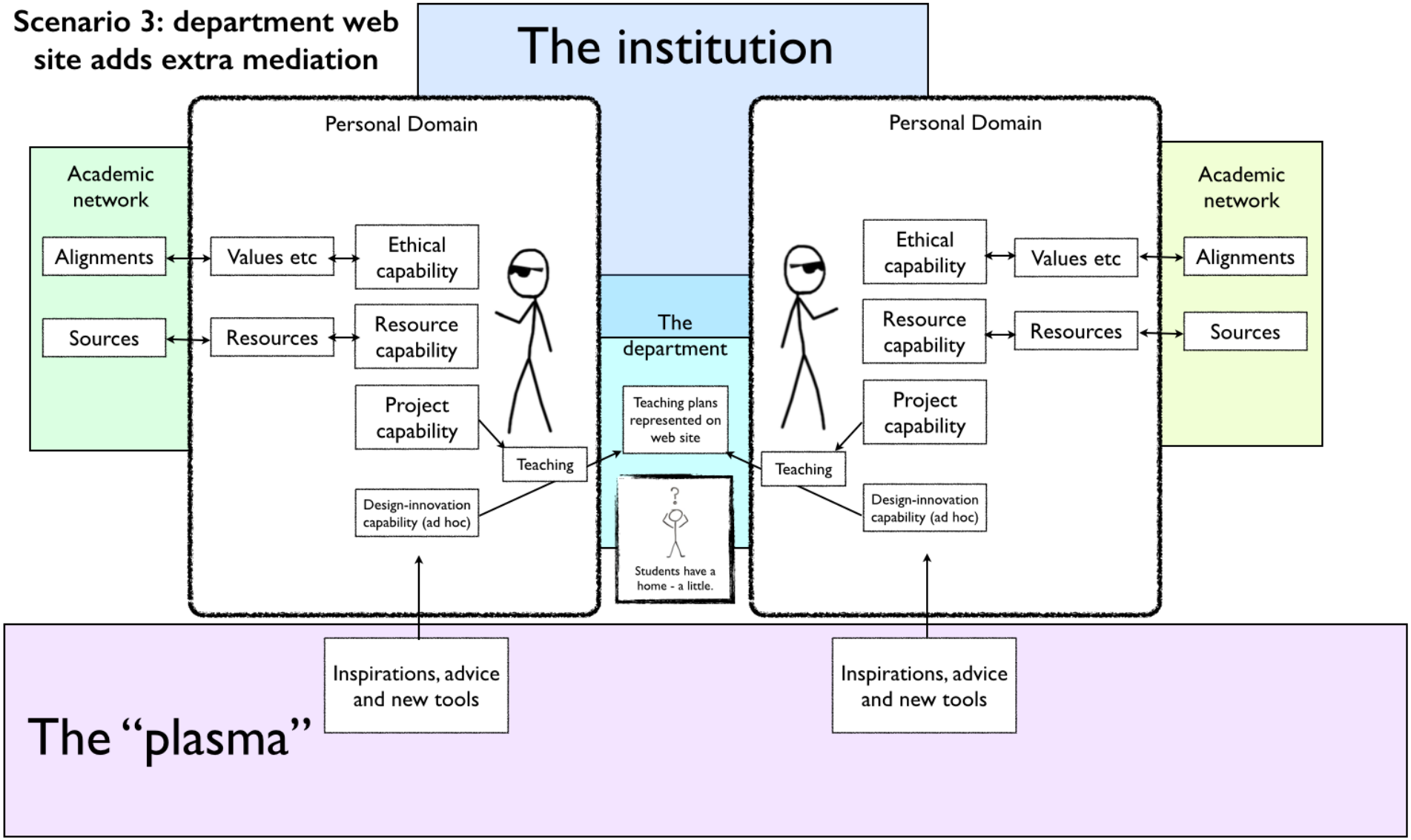
Scenario 3 is much closer to the situation that I have observed at Warwick, with the common ground of web sites in which, as described above, a degree of participatory and negotiated design agency is able to produce

representational structures that are in fact proxies for complex agentic and reflexive processes. This has the benefit of giving people a more real sense of “home” within the institution, although might still be quite a precarious and (as it is Web 2.0) easily changed (and even obliterated) kind of home.


Scenario 1: the private academic
The institution
Personal Domain
The academic has full control and ownership of their capabilities and resources. Design-innovation is ad hoc, small scale and localised.
Academic network
Alignments
Sources
Values etc
Resources
Teaching
Ethical capability
Resource capability
Project capability
Design-innovation capability (ad hoc)
Students as ambiguous visitors
Formal communications through contested and minimal interface.
Informal communications through negotiated but precarious interface.
Personal Domain
Values, concerns, principles are more likely to come through strong alignments with an academic network from beyond the institution.
Academic network
Ethical capability
Resource capability
Project capability
Values etc
Resources
Teaching
Alignments
Sources
Design-innovation capability (ad hoc)
Students as ambiguous visitors
The "plasma"
Inspirations, advice and new tools
Connections made to new technological practices in everyday life provide a route to (ad hoc) design-innovation. This may be quicker and more impactful than ideas coming from the institution and academic networks. Everyday life provides an easier, lower risk means to try out new tech. Through this route, academia is colonised by non academic commercial platforms.
Inspirations, advice and new tools


Scenario 2: strong institution, with overlaps
Collaborations and interchange with other educational and non-educational institutions and companies.
Students: nomadic
University B
University C
Public service
Company
Department A
Department B
Interdisciplinary activities
Students: nomadic
Students: nomadic
Resource capability
Project capability
Design-innovation capability
Institutional repository
VLE and other platforms
Specialist enhancement agencies
Institutional Shared Services
The University

**Scenario 3: department web site adds extra mediation**



Finally, the *meta-reflexives* are emerging as a much more significant group, especially within universities. For these people, a strong ethical base leads them to question the means by which they formulate and complete their projects. Organisations like SIBE, I have seen, emerge when meta-reflexives are dissatisfied with all of these scenarios. At the bottom of Scenario One and Scenario Two I have included something I call “the plasma” (term borrowed from Latour, 2007: p.241). This stands for the wider world of platforms and design repertoires beyond the confines of the institution. Meta-reflexives like SIBE will plunder this plasma for ideas and a broader design capability *for ethical reasons*. But it is not the *ad hocism* of the autonomous reflexives. Archer’s meta-reflexives see themselves as creating a way of life and becoming together:

> “…critically reflexive about their own internal conversations and critical about effective action in society” (Archer, 2007: p.93).

They are, in my terms, concerned with how they go about *designing*, and the values that such designing embodies. And that sounds very much like SIBE, caring about growing and spreading design capability for ethical advancement.

## 2.3 Designers, designerliness and design capability

Who designs? When we ask this question about an organisation we are enquiring as to the distribution of *design capabilities* across the organisation. Following the more complex assemblage and platform model of design, this is not simply a matter of role (designated designers), but of the distribution of *effective design agency* – the ability to change platforms and make assemblages.

There are many people, formal and informal, that can be described as designers. The official or unofficial distribution of design capability, and the authority to do designing, has an effect upon the form that designing takes in an organisation, both directly and indirectly through forms of resistance and alternative pathways. In turn that form influences the distribution of design capabilities.

So, where are the designers? And how do they do their designing? What kinds of spaces do they use? What kinds of tools and techniques? And what role does reflexivity play in this? – the research and experiences described below demonstrate some of the ways in which these variations impact upon the success of individuals and organisations in designing for good fit, stick, spread and grow.

This next contribution to the development of the designerly world-view considers four broad-brush categories of people acting and thinking in ways

that might be described as *designerly*. How do they do their designing? How does this alter their outcomes – individually and for an organisation?

### *2.3.1 Craftspeople*

We often associate the word "craft" with an older form of production, pre-dating industrialisation, going back to the medieval system of apprentices, journeymen and masters. However, the present idea of craft might owe more to reactions against industrialisation – including its re-awakening in the 19th Century Arts and Craft movement, and later in the Bauhaus. These varied ideas pitch the factory and its Fordist design studio against the artistic studio and the craft workshop. And more recently we might add to that the open and dark domain of street art. In each case there are questions of structure *versus* agency – the idea of craft has a strong repetitive element, leading to the masterly skill of the craftsperson, and at the same time there might be an inventive, artful, individual aspect giving the crafted item its special value over the industrial product. We might respect the solid time-won basis of craft, and mourn its replacement by the instantaneous culture of the digital. Our present notions of design have emerged from this dialectic. And in people's reflexive accounts of their work, notions of craft are still strong – especially in the University.

By entering into a craft, a person's constraints and enablements are transformed. The link between intention, action, material and product can engender an autonomous reflexivity, a joyous link between finding and solving problems in the process of creation. This might have an empowering and liberating effect. But it can also be a prison. I read Thomas Hardy's *Jude the Obscure* as a study of these paradoxes. The title character Jude Fawley

transitions from a rural lifestyle (communicative reflexives) to the craft of stonemason (and a kind of autonomous reflexivity empowered by the craft), but all the time has nagging meta-reflexive concerns:

> '"Every man has some little power in some one direction," he would say...' (Hardy, 1895: KL 5758)

And those concerns become focused upon the idea of becoming an academic - which in reality is as much a constrained craft. Hardy's dark humour plays upon these paradoxes, with Jude's desire to swap the craft of the stonemason for that of the academic (which in Jude's eyes is a kind of stonemasonry of ideas).

The value of craft and craftsmanship has recently been reassessed by philosophers and sociologists, in a positive emancipatory light (an old story, but now with a more sophisticated spin). Mike Rose, Matthew Crawford and Richard Sennett, follow similar paths in attempting to show how the craftsman[82], how working with our hands, may rescue agency from the woes of modernity.

In *The Mind at Work: Valuing the Intelligence of the American Worker* (2004), Mike Rose wrote of the craftsperson:

> "The work itself when seriously engaged - the traditions and values one acquires and the complex knowledge and skills developed - gives rise to a virtue of practice, an ethics and aesthetics, and a

[82] Sennett uses the gender specific form.

> reflectiveness intermixed with technique. Furthermore, as we've been seeing, all this becomes part of the construction of one's self." (Rose, 2004: KL 1903)

Similarly, Matthew Crawford, in his polemical *The Case for Working with Your Hands*, writes that:

> "The idea of agency I have tried to illustrate in this book is different. It is activity directed toward some end that is affirmed as good by the actor, but this affirmation is not something arbitrary and private. Rather, it flows from an apprehension of real features of the world." (Crawford, 2010: p.207)

But this does not mean that the judgement of the craftsman, flowing from their hands-on engagement with the physical, is infallible or that the matter-in-hand forms and operates perfectly to specification. The project draws out constraints, resistances, obstacles. The craftsman experiences breakdowns and seemingly intractable barriers. They are:

> "…ad hoc constraints known only through practice, that is, through embodied manipulations. Those constraints cannot be arrived at deductively, starting from mathematical entities." (*ibid.* p.24)

The unpredictable occurrence of these constraints, limiting the agentic flow of the craftsperson's projects, creates a rhythm in the daily working experience. We move through uninterrupted work, to the breakdown in flow, which

engages further cognitive (and possibly social) actions so as to find the problem and then to find a solution (or perhaps to sidestep the problem).

Crawford's polemic makes the additional claim that hands-on work finds its apotheosis not in manufacturing things, where the variables are too controllable, but in fixing breakages in existing already worn and weathered machines:

> "Fixing things, whether cars or human bodies, is very different from building things from scratch. The mechanic and the doctor deal with failure every day, even if they are expert, whereas the builder does not". (*ibid.* p. 81)

For Crawford there is something deeply *ethical* in the *aesthetic* experience of fixing broken things. Biological bodies are by default complex assemblages assembled from a stochastic combination of chance and necessity (Monod, 1972). Manufactured machines, like motorcycles, start their lives as clones, but each follows a different path of wear and modification in the world over time. Any single case of breakdown may thus embody, in combination, a lifetime of unpredictable interactions. In fixing these breakdowns, we encounter the world and its stochastic complexity, which may overwhelm our understanding.

Craft is viewed through these discourses as an ethical *creating good in the world*.

Richard Sennett also identifies the source of the ethical in the aesthetic experience of craft, although in *The Craftsman* (2009) he identifies further challenges and dilemmas that may require ethical consideration.

His opening chapter, and the rest of the book, are haunted by what he sees as the ultimate development of the craftsman's ethical dilemma, exploding with massive physical and philosophical force on July 16th 1945 deep in the New Mexico desert. The Manhattan Project is, for Sennett (echoing the reflections of some of its participants), an overstepping of the powers of the craftsperson, the flow of problem finding and problem solving gone out of control:

> "The craftsman's desire for quality poses a motivational danger: the obsession with getting things perfectly right may deform the work itself. We are more likely to fail as craftsmen, I argue, due to our inability to organize obsession than because of our lack of ability." (Sennett, 2009: p.10)

The craftsperson risks becoming too immersed, too dazzled by the beauty of their own work. Sennett argues that civilisation is not the work of philosophers, but instead produced out of the craftsman's experience, through their *reflexive* appreciation of consequences:

> "Yet the craftsman's ethos contains countervailing currents, as in the principle of using minimum force in physical effort. The good craftsman, moreover, uses solutions to uncover new territory; problem

> solving and problem finding are intimately related in his or her mind. For this reason, curiosity can ask, “Why?” as well as, “How? about any project. The craftsman thus stands in Pandora’s shadow and can step out of it.” (*ibid.* p.11)

Rose, Crawford and Sennett all identify a kind of meta-reflexivity as the link between craft and the ethical, leading to a more civilised world. For example, Rose identifies an “oscillation between action and reflection” as a “reflective cast to the technical work” (Rose, 2004: KL 2061). The oscillation out of engagement with doing moves the worker to a position standing back from the work and themselves, perhaps even a reflexive epoché (bracketing, to use the term from Husserl’s phenomenology). In his chapter on *reflective technique*, he writes:

> “Nancy and Peter are meticulous about the work they do, aware of its consequences, exhibiting both pride in and commitment to doing a good job. There are social and ethical ramifications here.” (Rose, 2004: KL 1955).

Ramifications, especially where a meta-reflexivity develops into people who are “critically reflexive about their own internal conversations and critical about effective action in society” (Archer, 2007: p.93). This is the key point. A good craftsman reflects upon the quality of their tools, and (in my terms) cares for their platform. As Rose, Crawford and Sennett demonstrate, in craftwork there is a close and very visible link between cognitive process and action (often mediated by sketching and other forms of modelling). Thought

processes and patterns may, in the workshop, become highly visible as one tool amongst others (and when working collectively, be made more visible in collaboration). The craftsman has all the conditions in place to become critical about their own thinking in relation to its actions on the world, and about the ways in which they think reflexively, and its consequences and side effects.

The experience of craftwork, as mediated through Crawford, Rose and Sennett, tells us how in craft agency is *not* located in just the formulation of projects and the selection and application of practices to fulfil those projects. As Archer found, the practices that determine these processes are still enabled and constrained by structure – the structure of the workshop, the tools, materials, canonical techniques, and roles (traditionally the apprentice, the journeyman and the master). It is not located in the flowing, sometimes ecstatic, overcoming of constraints and exploitation of enablements. Rather, it lies in the moment of dilemma, uncertainty, the ethical challenge that defines the specificity of the subject in time - the dilemma that pushes us to reflect, to think things through as far as we can go, to draw upon all of our resources, and commit to act even where there is uncertainty - where acting is the only way to find certainty. It lies in the place of the craftsperson, physically and socially – the workshop. There is then, in this way, a continuity between design and designing as defined above (especially in its ethical dilemma) and the ways of the craftsperson – although I argue that the world of design represents a complexification in both the end product of the activity (designers deal with complex things that are not so immediately to hand) and in the organisation of work and resources necessary for those ends (being well beyond the responsibility of an individual). Much of what I have observed

in academia belongs to this world of craftspeople, workshops and craft collectives.

Looking back into the history of universities, we can see how their purpose, organisation, spaces and methods developed alongside the world of craft. Some aspects, such as the lecture theatre, have changed little since medieval times. In his study of *The University in Medieval Life: 1179-1499* (2008) Hunt Janin describes the evolution of the university. It followed a path atypical within the medieval context, and perhaps pointing to the passage from the medieval to the early modern era. Universities increasingly followed the model developed in Paris, "…the model for the "masters' university" of northern Europe, one where the masters, not the students, played a leadership role." (*ibid.* KL 797). As with most universities today, the masters (academics) obtained and maintained a firm residency and ownership, while the students were less well rooted, almost as if visitors or consumers, not residents, owners or producers of the university. This bipartite arrangement had, over time, evolved from the pre-university Parisian "universitas", signifying the universal scope of its interests beyond a single specialization. The universitas did not, before the fourteenth century, have a simple location or even dedicated buildings. Specifically academic forms of architecture had not yet appeared, however academic administration, in the medieval form of "a guild or corporation" had formed "to protect the interests of the students." (*ibid.* KL 316). The paternalism of medieval institutions had to take hold of the chaotic self-organizing force of the students, the threat of disruption posed to the civic body, and of knowledge transfer beyond the confines of the monastic cloister. The lecture theatre may then be seen as a commons *and* an

instrument of confinement.

And on the other hand, the experience of the students formed a second, intersecting commons co-located in the lecture theatre. How does the world of the students and that of the masters form a single contested common ground? A battle ground? The constant battle between the two – the master driving onwards through the materials, and the resistant students – might have been a contest for control and ownership. The university as a novel institution had emerged in the thirteenth century as a necessity for self-organising students:

> "The universities appeared on the scene not because of medieval students' amor sciendi (love of knowledge for its own sake) but because these young men soon recognized the need to organize and protect themselves from rapacious townsmen and officials who were eager to profit from such a captive market." (*ibid.* KL 385)

But as in Paris, the balance of power soon shifted with the rise of the masters and the lecture theatre:

> "…a master would carefully read an approved legal textbook to his students - word by word, line by line - and would painstakingly explain the meaning and application of every sentence. Medieval law students had to memorize the opening words of enormous numbers of laws and to be able to recall them immediately and in proper order to keep up with the lecturers, who would refer to them quickly and without

pausing." (*ibid.* KL 861)

This is as would be expected considering the purpose of the university as derived from the prevailing ideology of scholasticism:

> "…the basic aim of teaching in the medieval university was to transmit to students, uncritically, selected parts of the medieval world's received (inherited) body of learning" (*ibid.* KL 425)

University teaching and learning soon diversified across a small range of more or less loosely-coupled forms, still contained within the multifunctional lecture theatre, as the sterility of scholasticism rooted in the practice of the monastic copyists (*ibid.* 432) was increasingly challenged. The lecture-seminar combination is recognisable in this description of *lectio* and *disputatio*:

> "Masters taught in two ways: the lectio (reading), when they read aloud and painstakingly explained an authoritative text while the students listened passively, and the disputatio (oral disputation), in which students themselves played an active role in debate." (*ibid.* KL 566)

As the universities developed, a distinctive university architecture and administrative structure developed to cater for and protect this new way of life. The academic common ground differentiated itself into lecture theatres, refectories, academic rooms, and halls of residence – following the need to regulate students:

> “They wanted to keep an eye on the students to prevent too many university and civil regulations from being trampled underfoot.” (*ibid.* KL 503)

As early as 1215 the lecture theatre, which had previously been a more open commons (with students not being tied to any specific course or college, and hence able to wander freely between places), became just part of a regulated matrix, with the rule of “nullus sit scholaris Parisius que certum magistrum non habeat ("nobody can be a student at the University of Paris if he does not have a permanent teacher")” (*ibid.* KL 507) pinning down the student into the grip of the personal tutor or supervisor. The balance of power was soon to be settled in favour of the masters:

> “If they did not abide by university regulations, they risked being locked up in a detention cell or even being "excluded," i.e., losing the all-important legal protection provided by their university privileges." (*ibid.* KL 409)

Today, following ten years of rapid technological and pedagogic innovation the lecture theatre is at the intersection of an extraordinary diversity – not simply in the format of delivery or the technological media, but also in the diversity of roles and relationships, expressing fundamental differences in opinion concerning the nature of knowledge and learning. The lecture theatre today acts as a container, or platform, or expressive medium for diversity, to an extent unimaginable for the medieval mind. But it is built upon a legacy of

medieval forms and its containment and delimitation of the common ground. And there lies the conflict between craft and innovation.

The designer's studio plays a very different role to that of the craft workshop (or the conventional lecture theatre). It is a place for gathering the supercomplexity (in time and space) of the world in which designs are deployed, and from which design ideas are developed. It is an open location for the intersection of a potentially unlimited number of platforms – design, as Buchanan (1992) argues, has no definite subject – other than this transversality.

### *2.3.2 Professional designers*

There is a much more uncertain but (to some) exciting world beyond the craft workshop and its close connection to materials and repetition. Jonathan Chapman gets to the route of this when he looks at the role of meaning in designs (the stories that are encoded into designs-in-mind and the stories made when designs are experienced and used). Chapman writes that:

> "Meaning is not something self-sufficient that lurks dormant within the semantic layers of an object until someone accidentally notices it, nor can it be universally designed or programmed. Meanings are created between people and things, and though designers can endeavour to create and trigger meaningful sensations within users, the explicit nature of those meanings is largely beyond the designer's control." (Chapman, 2005: 165)

This echoes the opening chapter of Deleuze and Guattari's *A Thousand Plateaus*, with its assemblage theory of meaning as being "between the lines", across the "territories", "transversal", continually contested, temporary and contingent.[83] Designing then is, more so than craft, a kind of supercomplex dialectic between design-in-mind (one set of theories), design-in-use (another set of theories encoded into designed things and emergent from use) and design-as-experienced (another un-predictable set of theories). In the world of Latour's ANTs it is that third term, *theory* deployed by and shaping actors in networks. And designers use their agentic strategies and their networks to seek some control over the open and unpredictable world for which they design (platform-oriented designing is the most comprehensive approach to this), and at the same time, they (increasingly) hope to benefit from that openness, in which their designs co-adapt to fit, stick, spread (to more people more uses) and feedback to enable growth. Professional design then is often, although not always, something far more unpredictable and transformative than craftwork.

So who are the professional designers? Some people and some professions explicitly identify themselves as "designers". They may have a strong background in craft, and their designerly ways might have emerged out of that background, but they have something more, and work in different more complex ways, often moving across many distinct domains to achieve their complex results – architects, as I discovered in my research, are typical of

[83] Their theory of meaning is part of a dynamic non-linear ecosystems approach to evolution in which: "movement occurs not only, or not primarily, by filiative productions but also by transversal communications between heterogeneous populations." (Deleuze and Guattari, 1980/1987: p.239)

this going beyond craft and into many transversal connections. Designers are both specialised and generalist. One might train and find employment as an architect, a software designer, an industrial designer, a product designer, a communications designer, a web designer, a service designer and (more rarely) a learning designer. But at the same time that leads into a necessity to work in many different ways, with many different peoples, disciplines and materials.

Other people are trained and employed in professions that will sometimes require them to do designing – in teacher training, we are told to "design a lesson" and "design assessment". The quality or effectiveness of the things that we create are evaluated for the quality or effectiveness of their design – assuming that this indicates an underlying capability for reliably producing good lessons and good assessments.

Yet more people work in more specialised roles within teams and industries, with designing as an output and design activity consciously distributed across the team or network. Tim Kelley's description of IDEOs multi-disciplinary design teams represents a well-thought-out approach to composing such a team (Kelley, 2005). But there are many other *ad hoc* compositions operating well in many different domains following different models. Variations on the studio approach, as described above as that used by Touch Press, are common in the new creative industries. In higher education, course production and delivery teams often evolve along these lines.[84] This might

[84] I worked in such a team at Oxford University, called Technology Assisted Lifelong Learning, it produces and delivers online courses for the Continuing Education Department. At Warwick I have observed how the e-learning

even extend well beyond individual companies into a broader networked ecosystem of people with different talents and interests, as described in Chris Bilton's book *Management and Creativity* (2006) and James F. Moore's study of the ecosystem surrounding ARM microprocessors - *Shared Purpose* (2013). As will be seen, higher education might be best conceived along these lines. In my research, the most successful of the departments and projects studied in the University have consciously operated as ecosystems of diverse people working together in well organised and well understood practices to achieve well designed outputs.[85]

But what do all of these diverse people and activities have in common? What makes them designers? A popular way of recognising a designer is through their end-products *plus* a notion of something special added to the end product. Thus builders make houses, but designers can help them to make good (or bad) houses – better designed. As Latour pointed out, being a designer adds an extra ethical dimension to production beyond the craftsmanship of putting materials together well. And there is, following this reasoning, a sliding scale of designed-ness. I can buy an own-brand shirt from a supermarket, and it might be adequate. But I can buy a different shirt from Saint Lauren and it will somehow be a better shirt – imprinted with the singular vision of the designer (or rather, the named designer directing a team of designers). The common notion of the designer then contains some dubious assumptions concerning class and value. Ideas that probably have

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production unit in the Warwick Business School has evolved along these lines, inventing job specifications and titles previously unheard off in higher education.

[85] The Warwick Writing Programme, CAPITAL, Reinvention are prime examples, but we can also find the model in most academic departments that employ a range of contracted teaching and research staff blended together.

their origin in early Capitalism and companies like Wedgewood (not merely imitating Chinese products, but surpassing them through the genius of the designer and the discipline of the craft). But if we discard our designer labels, we still have a useful idea: things that have gone through a process of being designed should be better. And following that, we have the notions of design process and design genius – paradoxically defining a common notion of the designer (craft, and later science, plus inspiration).

In *How Designers Think* (2006), Bryan Lawson reports upon attempts to study how designers do their designing. The assumption in this focus on methods and heuristics is that a commonality exists across all of the different fields, regardless of the end result. Lawson begins by acknowledging the problem of definition, and going down the route of defining designers by how they work and what they can add to craft and manufacturing, rather than what they ultimately produce.

A definition of designing and the designer then emerges as a combination of a certain type of task or challenge, and an attitude and relationship to those challenges:

> "From our analysis of the nature of design problems it is obvious that, taken as a whole, design is a divergent task. Since design is rarely an optimisation procedure leading to one correct answer, divergent thinking will be required." (Lawson, 2006: KL 1731)

The designer must steer a design project, the emerging idea, through many

complications, diverging and complicating, finding multiple pathways, diverging and narrowing down. They must go into detail and "converge" when required to get the detail and the connections between elements right:

> "…there are likely to be many steps in any design process which themselves pose convergent tasks." (*ibid.* KL 1732)

And overall, they must self-consciously manage the difficult and sometimes confusing progression towards a satisfactory end-point:

> "Design clearly involves both convergent and divergent productive thinking and studies of good designers at work have shown that they are able to develop and maintain several lines of thought in parallel." (*ibid*. KL 1734)

This is said then to constitute not simply a formal process (although such formalities might be used), but rather a way of thinking, modes of reasoning, means for representing and modifying ideas (especially sketching and 3d modelling) and a kind of reflexivity characteristic of the designer.

Professional designing might then be described as process (or structure) and people (with reflexivity) combined into action (agency). Pixar's Ed Catmull reflects upon these combinations in explaining the success of his business (in *Creativity Inc.*). He argues that a common myth in many creative-designerly businesses is that *if you have the right process, it will always work out in the end*. During the making of *Toy Story*, the Pixar team told themselves to "trust

in the process" as a kind of emotional crutch to get them through some very hard times. But when they tried to repeat their success for *Toy Story 2* the myth of the process got in the way. It stopped the team from reflecting upon their own practices and their limitations. This almost led to disaster (literally, it came close to causing the death of a child). But just in time they opened-up a designerly-reflexive dialogue which foregrounded the contributions of people over the power of the process. Ever since, the balance between the two has been a subject for debate. The eventual resolution perfectly expresses the balance found by many professional designers:

> "When we trust the process, we remember that we are resilient, that we've experienced discouragement before, only to come out the other side. When we trust the process—or perhaps more accurately, when we trust the people who use the process—we are optimistic but also realistic. The trust comes from knowing that we are safe, that our colleagues will not judge us for failures but will encourage us to keep pushing the boundaries. But to me, the key is not to let this trust, our faith, lull us into the abdication of personal responsibility." (Catmull, 2014: KL 1277)

In *Designerly Ways of Knowing* (2007), Nigel Cross takes a similar approach, with the aim of understanding "design cognition" as a formulation of design problems (emergently through the actions of the designer) paired with solutions. He states that:

> "People who seek the certainty of externally structured, well-defined

problems will never appreciate the delight of being a designer." (Cross, 2007: p. 24)

And so designing is differentiated from more straightforward forms of problem solving and procedural work. According to this view, we call on a designer when a problem cannot easily be defined – it is not simply a matter of applying more resource to the task, or increasing the computational power available for an already well known algorithm. Designers take an interest when there is no clearly defined problem, and their skills and judgements bring forth a better idea of *what we want (some aspect of) the world to be like* and *how we can make it like that.* Cross describes some of the tactics and techniques that are commonly employed: constructive diagrams, sketching, finding and exploring generative ideas, metaphor, patterns, prototyping – and most importantly, a reflexively managed balance of discipline and creativity. This is summarised as "five aspects of designerly ways of knowing" (*ibid.* p.29):

- "Designers tackle ill-defined problems."
- "Their mode of problem-solving is 'solution-focussed'."
- "Their mode of thinking is 'constructive'."
- "They use 'codes' that translate abstract requirements into concrete objects."
- "They use these 'codes' to both 'read' and 'write' in 'object-languages'."

The nature of these 'codes' and 'object-languages' varies greatly. They may

form a pattern language, or something less clearly stated (as seen in most cases studied for this project). We can assume that they vary between designers and design disciplines. But the Cross-Lawson perspective does unite designers through the designerly way of knowing. We can look for these ways of knowing (and doing) in other domains – including higher education. And furthermore, the Design Thinking strategy aims to spread, facilitate and develop these designerly capabilities more broadly amongst ordinary people who might not describe themselves as designers.

Before moving on, however, a word of caution is necessary concerning the Cross-Lawson approach. In their studies, which have largely concerned architects, designerliness is encapsulated in individual designers, or collaborations of similar designers. Architects are the most well studied of the design disciplines, possibly followed by industrial designers. In architecture there is a clear separation between clients and designers, in which:

> "Clients often seem to find it easier to communicate their wishes by reacting to and criticising a proposed design, than by trying to draw up an abstract comprehensive performance specification." (Lawson, 2006: KL 624)

Cross concurs with this claim:

> "Often, the problem as set by the client's brief will be vague, and it is only by the designer suggesting possible solutions that the client's requirements and criteria become clear." (Cross, 2007: p.34)

However, there is some *distribution* of the cognitive and reflexive effort across the various minds – architect and client – and we should extend that to include other agents too, including engineers and planners. But still, in the Cross-Lawson perspective, the designer owns the powerful designerly capabilities, the necessary “multi-faceted” and “multi-leveled” reasoning (Cross, 2007: p.34), for taking into account all aspects of the project (including constraints) and finding (imaginatively) an appropriate generative idea from which to develop the solution.

But even in architecture, the border between client and designer might be eroding – as I discovered when I interviewed the BGS architects who are involved in the new Teaching and Learning Building project. Building design may be increasingly responsive to the needs of the client. And consequently, clients take on a more prominent position in the design team. And furthermore, buildings themselves are becoming more re-configurable and fluid. When does the designing stop? In other domains, such as service design, the design process might occur as a distributed activity, with different people coming and going over time and shaping its development – this is certainly true of designing in education, which is (as I have discovered) far less stable than other forms of designed practice. The IDEO *Ten Faces* approach acknowledges the distributed and multi-disciplinary nature of professional designing. There is no master designer. Instead, there are well understood roles and protocols for moving the project in the right direction (as with the Braintrust approach used at Touch Press).

*What is a designer?* – that turns out to be a far more complex and perhaps unanswerable question. They are certainly not straightforward *autonomous reflexives* engineering instrumental systems. We can attempt to answer it by describing the types of problem upon which they work and the 'design cognition' and tactics that they employ. Add to that a powerful kind of reflexivity concerning how and why they do designing – a *designerly meta-reflexivity*. Such a definition is useful, and will be applied in this thesis. But it cannot be exhaustive – it is merely indicative. I will add to it a simpler idea. Something that might be missing in Cross, Lawson and similar researches, but which comes from designers themselves (as will be seen, it is strong in the ideas of Tim Brown). It is the normative idea of a "design profession" made up of people who work towards, are dedicated to, a better designed world through better design methods and practices. As it stands, academia does not consider itself to be a "design profession". The lack of any well-developed pattern language illustrates this. I found that design activity is fragmented into numerous fields and sub-fields with little apprehension of the design agency that runs across these divisions.

### *2.3.3 Guerrilla designers*

Not all of the people who do designing actually work in officially recognised "professional designer" positions. And not all of the people who care about good design and designing in a designerly way are "design professionals". There is, I have found, an important class of people who use designerly approaches for the sake of a better designed world. And furthermore, they are trying to get more people, more institutions, more projects to take design seriously and benefit from designerliness. They are to some extent *designers under-cover*, and in some cases, *guerrilla designers*. These people are actively countering the forces of fragmentation and disconnection in the University.

I am, in much of my professional work, a guerrilla designer. There are very few people at the University of Warwick employed explicitly as professional designers. And perhaps as a consequence, there is very little appreciation of design and designing, even though it is one of the most design-intensive of organisations. I am also part of a small network of other *designerly* people who are trying to change the situation through small increments and experiments. Rob Batterbee of Warwick's Student Careers and Skills Centre is also a guerrilla designer. Rob is a trained and experienced designer. He has worked in many design fields, including theatre design. When I interviewed him about his ways of working, he described a sophisticated, design-informed approach. This is a typical extract:

> "I prefer to work with people as the interactivity and proximity effects have profound influence on my workflow and ideas generation. The to

and fro of ideation with other people. I also like to be able to share knowledge/ideas with colleagues as this often triggers a discussion, or a response from the colleague triggers an idea from me. Colleagues often come to me with a problem, I'm seen as a good, open collaborator who isn't precious about 'ownership' of ideas. I am quite fortunate that idea generation comes very easily to me (although I'm not certain how!)."

At Warwick, he is an "IT manager" – an extremely broad role. The Student Careers and Skills Centre faces many significant challenges, and must innovate effectively to keep up with the demands and evolving working practices of its students. Rob believes that in order to achieve this, it needs to become more designerly. But in order to achieve that, the attitudes and capabilities of some of his co-workers will have to change – to become more designerly. He hopes to use the IDEO strategy with dedicated Design Thinking spaces to achieve this. Already we have had some success in this. The URSS Portfolios project has succeeded through an enhanced awareness of design issues and design approaches. On August the 19th 2014, the coordinator of Warwick's Undergraduate Research Student Support Scheme posted the following tweet:

**Nathalie Dalton-King** @DrDaltonKing
It has become apparent that I am a Design Thinker. EEK – Thanks @robertotoole & @RobBatterbee for helping the discovery!

One small advance in the guerrilla campaign and its meta-reflexive cause.

But we should also consider the potential down-sides of guerrilla designing,

and the negative impacts that they may have upon designerly capability. There are potentially *unconscious* effects resulting from the *unofficial* nature of their designing and the design ideas that they produce. Furthermore, the liminal and sometimes transgressive nature of their work can distort their own perceptions of its value – perhaps with an unconscious bias in operation: "I've struggled hard to get this idea accepted, persisted against the odds, so it must be good". Meta-reflexives of the kind described by Margaret Archer might have good intentions, but that does not ever guarantee the rightness of their cause – and may in some cases make matters worse. *Personally, I will admit to making this mistake, and having learned lessons from the objectifying approaches used by professional designers to objectify and test the validity of my ideas with broader collaborations*.

As will be seen, the IDEO approach is built around a balance between enthusiasm (in the Inspiration Space) and objective rigour (in the Ideation Space). There are many, often tacit, wise designerly techniques that can help, and which can enhance guerrilla designing. The iterative process of inspiration-ideation-implementation may, for example, sometimes benefit from long pauses. In the discipline of creative writing, David Morley (Director of the Warwick Writing Programme) suggests that a text is left for six weeks before exposing it to critical stress: "it's easier to murder someone else's darlings than your own." (Morley, 2008). If we consider designing to be akin to story-making and telling (following Jonathan Chapman), then we need to listen to the advice of creative writing teachers. Otherwise the narratives around which designs are constructed, encoded into designs, will be at best of limited interest and at worst completely misguided – failing to achieve fit, stick,

spread and grow.

This idea is also there in film making. Ed Catmull described this meta-reflexive realisation as being essential to the success of Pixar. In their equivalent of IDEO's Ideation Space, the Braintrust, this creative-critical separation, objectification is essential:

> "The film itself—not the filmmaker—is under the microscope. This principle eludes most people, but it is critical: You are not your idea, and if you identify too closely with your ideas, you will take offense when they are challenged." (Catmull, 2014: KL 1441)

And:

> "We believe that ideas—and thus, films—only become great when they are challenged and tested." (*ibid.* KL 1436)

This is again the dilemma of the craftsperson – to do their work they have to become enraptured by it, but at the same time they need ways of controlling that rapture so as to retain the essential critical edge. However, the sheer complexity of making the thing mitigates against that objectivity. And worse still, finding the root of problems, is a [super]complex challenge:

> "A mystifying plot twist or a less-than-credible change of heart in our main character is often caused by subtle, underlying issues elsewhere in the story." (*ibid.* KL 1430)

Conquering a challenge, taking a production to the edge and then saving it, has an unhelpful cognitive biasing effect – the production we saved from disaster must be great, surely. A more professional designerly attitude is necessary. A strong meta-reflexive commitment to values of quality, with what Catmull calls *candor* and a dedication to rework and rework until we get it right:

> "Creativity has to start somewhere, and we are true believers in the power of bracing, candid feedback and the iterative process—reworking, reworking, and reworking again, until a flawed story finds its throughline or a hollow character finds its soul." (*ibid.* KL 1389)

This is a challenge that requires the most experienced and intelligent people you can find, who are then able to work in just the right kind of critical-creative relationships, with a sustained energy over time. And perhaps these relationships, and this care for their maintenance, are the most significant aspect of being a professional designers.

But even when guerrilla designers have these additional levels of understanding, reflexivity and capability, their organisations do not necessarily provide the facilities that will help them to operate as effectively as possible – no studio, no position on the org chart or the workflow. As will be seen, in the University, we have very little access to the kinds of *persistable project spaces* that are required to facilitate the creative-critical process in a coherent and open manner. We have few places that can be

occupied by a project for a long duration, populated with its design knowledge, ideas, prototypes, stories, jokes, data in the form of sketches, post-it notes etc. Places into which we can welcome, by invitation or by accident, a broad range of people who can contribute to the critical-creative dialogue, making peripheral participation legitimate. Places of the kind used to great effect by professional designers. This further forces design activity underground – occupying and adapting whatever spaces are available.

*One of my unofficial design spaces in the Teaching Grid at the University of Warwick. I can freely move between the whiteboard, my MacBook and the big screen. I can easily bring people in, often as randomly encountered, to look critically-creatively interact with my ideas (the Teaching Grid has a steady flow of interesting people).*

### *2.3.4 Everyday designers*

In The Sciences of the Artificial, Herbert Simon observed the ubiquity of designing as seen through his simple definition:

> "Everyone designs who devise courses of action aimed at changing existing situations into preferred ones. The intellectual activity that produces material artifacts is no different fundamentally from the one that prescribes remedies for a sick patient or the one that devises a new sales plan for a company or a social welfare policy for a state." (Simon, 1996: p.130)

We might call this *everyday designing*. Having defined designing as a complex activity undertaken using sophisticated cognitive processes and tactics, Cross extends the activity to ordinary people on a sliding scale of designerliness. He states that "design ability is possessed by everyone" (Cross, 2007: p.38):

> "Everyone makes decisions about arrangements and combinations of clothes, furniture, etc. – although in industrial societies it is rare for this to extend beyond making selections from available goods that have already been designed by someone else." (ibid. p.38)

Following Cross, this more everyday designing is a relatively trivial activity, compared to the proper designing of professional designers. We might also arrange the work of the professionals into various hierarchical schemes – rated by technical difficulty, or by long term impact (architects at the top?), or by the "wickedness" of the problem domain – with *components and products* at the bottom, then *system-level problems* in the middle, and *community-level problems* at the top (following the schema described by J. Christopher Jones in *Design Methods: seeds of human futures*, 1970).

It is indeed the case that our everyday lives are increasingly filled with superficial design choices. There is even a business model that takes advantage of the limited transfer of design agency - as described in "The Ikea Effect: When Labour Leads to Love" (Norton, Mochon & Ariely, 2011). It is claimed that we feel more satisfied with a product when we have to put in a small amount of work to configure it for our own preferences.

But this is not *my* definition of *everyday designing*. I argue that there are many activities that are more substantial, more significant, more designerly, undertaken by people who are neither professional designers nor guerrilla designers, on a daily basis. When taken out of context, in isolation, each of these acts might not seem much. We do not identify them as design innovations in themselves, they do not follow the application of great design effort. Earlier, I gave *designing a lecture* as an example of design activity that is not usually design innovation (on the sliding-scale of innovation). But what if over time I design and redesign lectures, developing a unique style and tricks and patterns all of my own? – recall the case of Peter Abrahams and his "intestinal apron". That is what I mean by *everyday designing* – incremental, emergent inventiveness. Now think about how in any given activity today, especially computer-based activities, we have ever greater abilities to reconfigure, combine, create, roll-back, revisit and share. That then increases the scope for and reach of our everyday designing. In the near future, whole institutions may be [re]made in this way, perhaps following a more platform-centric model (I argue that MOOCs are an attempt to do this). Currently, as we have seen in the cases of the innovators described in this

thesis, newly designed aspects of the University are emerging through the everyday designing of everyday people.

This positive view of everyday designing must, however, be balanced against potential dangers inherent in collapsing together the three aspects of the design defined above: the design-in-mind, the design-in-use and the design-as-experienced. When platforms allow for continual and rapid modification (and roll-back of modifications) they might encourage us to design in a way that is too hands-on, too disconnected from the bigger picture, with little opportunity for learning and the wider spread of innovations. Why bother designing through sketches, plans and dialogue when you can just make changes to the things themselves? Why bother describing and reflecting upon your design ideas when you can just make it happen un-mediated by any kind of design dialogue? This might lead to a more *ad hocist* approach to making and using things. It might lead to inefficient replication of effort. In some cases bad habits will become too sticky, in other cases good things might go unnoticed and disappear. And in turn it might degrade our design capabilities. In relation to Archer's "modes of reflexivity" argument, this might be an attractive situation for *autonomous reflexives*, but does little for the wider *designerly meta-reflexive* concerns. At a longer term organisational or even societal scale, everyday designing could be part of a vicious circle – design capability (including time and places for designing collaboratively) is degraded by everyday designing, which then makes us more likely to work in that way, and further degrades the capability.

Can we mitigate against these effects? Can we actively manage design

capability for the benefit of individuals and the organisation so as to achieve greater (more appropriate) fit, stick, spread and grow?

# 2.4 Challenges in managing design capability

In this chapter we will examine some of the implications of the spread of designing and designable platforms in the modern world and the University, as a source of ever developing supercomplexity and increasingly difficult design challenges – introducing concepts that help us to understand the nature and origins of these conditions. Specifically, what are the challenges that this causes when we try to create, manage and sustain design capability across a supercomplex University? Knowledge of these challenges informs a range of strategies, including Design Thinking. Strategies that seek to more actively manage design capability and the *organisational learning and design loop.*

### *2.4.1 Ad hocism and the loss of design knowledge*

Viewed from the perspective of a service manager (for example, running an institutional web platform) the emergent inventiveness of everyday designers might appear as an unruly *ad hocism.*

*Ad hocism* is a challenge to the manageability of design capability – but also at the same time a source of fresh ideas.

They might welcome such improvisation (as in the case of Warwick's Learning Grid manager Dean McIllwraith). Or they might regard it as disruptive. Sometimes systems are designed to cope with a constant level of variation. There might even be a service development forum, process, protocol and dedicated resource that seeks to respond to emerging trends

and to incorporate innovations into the system and broader user behaviour (in IT Services at Warwick, the Service Development Group has this role).

In design theory, *ad hocism* has been recognised not simply as an accidental artefact of complex systems and inventive humans, but as something to be *designed for*. In their 1972 book *Adhocism: the Case for Improvisation* (revived by MIT Press in 2013), Charles Jencks and Nathan Silver argued that *ad hocism* is an essential part of humanity's inventive history *with machines*:

> "Nearly all creations are initially *ad hoc* combinations of past subsystems." (Jencks & Silver, 1972/2013: p.40)

This emergent inventiveness plays with combinations and the DNA of devices and systems in what they call "mechanical evolution" (*ibid.* p.40)

*Ad hocism* is both complex and unpredictable, but it is neither chaotic nor undifferentiated. There are regularities in our improvisations, determined by a special (open) phylum of forms around which we build – the simplest and most powerful example being *the wheel*. They argue that:

> "…any form is a possible member of an open set, a condition for which I will coin the term "multivise." This word has the semantic advantage of calling attention to two complimentary qualities – the "multi"-potentiality of any form as well as its inherent vise-like restrictedness." (*ibid.* p.44)

The wheel *suggests* uses and combinations. It affords certain movements and connections, and resists others - in Donald Norman's terms, it has *enabling constraints* (Norman, 1988). And through time, the wheel has found itself repurposed into design assemblages of many types for many ends – around which all kinds of extraordinary creations and adventures occur. Perhaps the only form of greater significance than the wheel is that of the human body itself. We might interpret the Open-space Learning pedagogy (described above) as an *ad hocism* built around the human body, the theatre workshop and the ensemble space as an assemblage of multivises that lead back to and make the most of the body.

But *ad hocism* as a *design strategy* goes further than that. It has political concerns – in favour of the democratisation of designing and ecological designing. The idea was simple: if people were able to be creative, re-inventive, with what they already have, with the intelligent addition of *ad hoc* modification (rather than the ceaseless churn of consumer Capitalism) then not only would they be more satisfied, they would consume less and conserve more. However:

> "The problem is once again how to encourage this creativity on a large enough scale for it to be significant." (*ibid*. p.70)

And in addressing this, in 1970, they were faced with major logistical challenges:

> "This experience points out the two main problems which tend to discourage *ad hoc* design: (a) such information sources as a Sears, Roebuck catalogue do not list all the products of a society, nor (b) in a way sophisticated enough for one to see that any product can be used, relevantly, out of context." (*ibid*. p.63)

But now we have The Internet, and *ad hocism* is a fact of everyday life. Back in 1970, they suggested that:

> "One means of doing this is to set up information centres. The parameters of an object or subsystem would be indexed on microfilm so that the individual could specify his needs *prior* to looking for an object. Because of the sensitive feedback between demand and supply, desire and fulfilment, this would lead on a consumer's level towards the conditions of "participatory democracy"". (*ibid*. p64)

We might now consider that to be a little naïve, although we are yet to see fully just what the present redistribution of the means of production and distribution will lead to – especially in the domain of education. However, Capitalism has responded not only with ever-more pervasive *platforms* but also with clever tricks for manipulating behaviour in those platforms, as described by Chris Nodder in *Evil By Design* (2013). And as will be seen, institutions like the University are still working-through the implications. However, perhaps the future generations of students are already there. For example, my children. I watch them "play". Each child has an iPad. They also

have an iMac. The iPads are running Minecraft[86], connected to the same world. Lawrence (age 9) moves between his iPad and the iMac. On the desktop computer he is searching the internet – Minecraft forums and a wiki, for ideas to construct and adapt the simple blocky elements of the Minecraft platform. He then formulates a plan. A maze is constructed with a massive mountain of TNT at its heart. A second enclosure is created containing a secret. Alex (age 3) is told that if he can just wait ten minutes without exploding the TNT he can then have access to the secret. Is that cruel or ingenious? It is pedagogical, experimental and entertaining.

In Nathan Silver's *afterword* to the 2013 edition of *Adhocism*, he acknowledges the transformations that have occurred as a result of digital technologies *and* innovations in business systems (especially Supply Chain Management, with its good and bad implications). He also stresses the continued value of the original ideas:

> "As seen, the happy new day of electronic communications for individuals has given (that is, given us) power, but it is very unequal, and will be for the foreseeable future, against multinational corporations in a cybereconomic arms race. The takeaway lesson of electronic communications on society is that it has raised the *ad hoc* connective possibilities all right – beyond irresistibility. It's become our

[86] As with Lego, Minecraft has powered the spread of design thinking to new generations. The official Minecraft Construction Handbook contains advice in recognizably *designerly* terms, for example in the section on Palace Gardens by FyreUK: "A symmetrical design may seem appropriate for a formal setting, but if you play with asymmetrical designs you can make a more interesting build…The island is circular, but it's not quite a perfect circle so it still looks natural and organic." (Needler & Southam, 2014: p.22-23)

> world, and if we don't welcome it, we'd better have the temerity and heroism of Jane Jacobs to change it." (*ibid.* p.210)

Finally, I want to add to this a further *ad hoc* connection. Also in 1972 (in French) the philosophers Gilles Deleuze and Felix Guattari published their revolutionary text *Anti-Oedipus*. This in many ways mirrors the ideas of *Adhocism* (a seemingly parallel evolution). However, Deleuze and Guattari add a further, hugely significant twist that is not so clearly expressed by Jencks and Silver:

> "We believe only in totalities that are peripheral. And if we discover such a totality alongside various separate parts, it is a whole of these particular parts but does not totalise them; it is a unity of all those particular parts but does not unify them; rather it is added to them as a new part fabricated separately."(Deleuze & Guattari, 1972/1983: p.42)

The implication is that big totalizing ideas, like for example "the State", "the consumer" and even "the University" are themselves *ad hocisms* – not subsisting in the things that they describe, but added-onto and maintained through additional mechanisms. Theories are in this way grafted onto assemblages, designed and emergent. And as such they are just parts of the *mechanosphere* and its "mechanical evolution". Every component that performs this kind of totalizing role has its specific machinic qualities and non-linear implications for the rest of the system – over time. The extent to which they are continually useful "multivises" is then questionable – a matter of concern and investigation for designers (everyday, guerrilla and professional).

### *2.4.2 Trees, meshworks and rhizomes cause platform stickiness and reduce spread*

Linked to the challenge of the native *ad hocist* forms of making, is the notion that the things we are trying to make and make the best from are formed into complex meshworks, not simple knowable and controllable structures. *Ad hocism* is a reasonable response to such supercomplexity. But in the end it often only acts to complexify matters further.

"A City is Not a Tree" wrote Christopher Alexander (later to invent the concept of design patterns) in 1966, reacting against an idea in urban design that is at the same time *descriptive* (we can analyse human organisation into a tree-like structure), *normative* (humans are best organised into tree-like structures) and *constructive* (we can make and manage complex, massive, multi-level tree-like structures). Alexander rejected all of these ideas. The city is not, and has never operated as a tree-like structure – we simply cannot do justice to the complex organic "thing" that is a city by describing it on these terms. And furthermore, it is not tree-like because a different kind of organisation, a "meshwork" of intersecting resources, needs and accidental emergent facts, is *how humans like to live*. Finally, making and managing a tree-like city is just not feasible.

We might extend Alexander's argument to apply to other complex (or perhaps supercomplex) emergent organisations. For example, the University.

This concept of the University might scare many people in higher education and beyond, even when they recognise its verisimilitude to actual experience.

Early-on in the life of this research project, an informal discussion with a new colleague at Warwick University highlighted the seriousness of the matter in quite stark terms. Despite his many years of experience in one of the most complex and scientifically advanced of manufacturing industries, and all of his training in the latest process management techniques (including Six Sigma), he declared that:

> "This place makes no sense at all, it's just a random mess of different people doing their own thing, but worse than that, I can't see any common starting point as a focus for improving things. It's hopeless. A basket case." (Anon.)

Of course it is not necessarily *hopeless*, just supercomplex in a way that reflects the supercomplexity of the kinds of big, wide-open, ecosystems amongst which it should be classed –a university is more like a city than it is like a company, and a city is itself not a tree-like hierarchical system, it is of the kind of interwoven "semi-lattice" described by Christopher, or a multi-layered assemblage of "rhizomes", as described by Deleuze and Guattari in *A Thousand Plateaus* (1980/1987).

Considering the nature of our most populus cities and organisations as they have evolved through the complex interplay of professional designing, everyday designing, accident, opportunism and the dynamics of complex systems, Alexander's arguments against *arborescence* are rarely contended. However, his conclusions about how we should design for the city (or organisation) as a meshwork are challenged. Jencks and Silver would agree

with the organic model, but the idea that technical and algorithmic mastery of complexity can result in better urban planning is rejected (in a footnote on Alexander's paper):

> "He argues here that only by relating all of the countless parameters of a city can the architect hope to achieve the rich, organic complexity of past cities which grew slowly." (Jencks and Silver, 1972/2013: p.64)

And furthermore, they reject as over-optimistic Alexander's claim that the control of real cities is *ad hoc* (Jencks and Silver, 1972/2013: p.20). Cities, as we know them today, are both out-of-control and subject to *regimes* of control that fight against *ad hocism* and the organic. And as Deleuze and Guattari argue, such *ad hoc anti-ad hocism* introduces further turbulence and complexity.

### *2.4.3 Types and levels of complexity or supercomplexity*

So things are complex, or even supercomplex, but we can tame this a little by being more analytical about types of complexity in the challenges that face us in managing design capability.

In programming (and in teaching) we actually experience a range of different phenomena that might get called *complex*, but which are in fact quite different in kind (not degree) – various forms of complexity.

The complexity *in* and *of* the university may be classified as being of three forms, two of which are defined by Fred Brooks (1986) in his classic paper

“No Silver Bullet – Essence and Accident in Software Engineering”:

**Essential complexity** – we sometimes want or need to achieve outcomes that depend upon the coordination of many diverse entities and processes, the complexity is ineliminable.

**Accidental complexity** – additional *eliminable* complexity is introduced by the methods we use to represent and solve problems, or by the mistakes that are made when formulating and dealing with complex problems.

I will add to this a third form:

**Fortuitous complexity** – the discovery of champagne being a classic example, error, or not-entirely deterministic play, can sometimes lead to inventions that are desirable because of their uniqueness and accidental complexity.

Brooks’ 1986 paper represents a point in the process of complexifying complexity in programming. Agency, in this model, at the same time: 1. reduces or finds clever ways of handling complexity; 2. benefits from the ability of complex systems to do complex tasks; 3. creates unforeseen complexities. Every computer programmer knows just how that feels – beautiful code instilling a feeling of genius, and the horror of knowing that there will be bugs and vulnerabilities in there *somewhere*, and the delight in finding inspiration for unforeseen enhancements when working hands-on deep in the application programming interfaces (APIs). As we have seen, the

discovery and exploitation of fortuitous complexities are an important part of designerly agency and reflexivity. But that also has potentially supercomplexifying consequences.

We can also discern three *levels* of complexity:

Some problems are complex simply as a matter of scale, intensity or detail. Let us call this **Level 1 Complexity**.

Other problems are complex because they involve seemingly incompatible combinations of different kinds of entity or systems – especially human value systems: **Level 2 Complexity** – supercomplex in Barnett's sense.

Yet more problems are complex because they evolve in response to our interactions with them, such that as we try to solve the problem it changes, ever slipping away from our clutches – a non-linearity exists between the problem and the act of attempting to solve the problem: **Level 3 Complexity**. This latter category of complexity is commonly experienced when working on problems that involve intelligent agents, who are able to make their own interpretations of the system or create novel responses based upon experience from outside of the system and the problem domain – the intelligent agents learn and imagine, co-adapting with each other and the programme. An attempted solution to a problem at Level 3 complexity might lead us into a wicked problem. Especially in that: "Wicked problems have no stopping rules" (Buchanan, 1992: p.16) – by making changes that address the problem, the problem evolves and intelligent agents change their

understanding and perception of it, along with their understanding of what counts as a solution.

## 2.5 Strategies for more designerly designing

So what can we do about this developing supercomplexity and its underlying *ad hocism*? What ideas and strategies have emerged from designers, design theory and practice? How can design capability be developed in a more evenly distributed, participatory, ethically-directed and enduring manner across the University? These are matters of *design strategy.* What kinds of strategy will help?

In the chapter on "Corporate Design Strategy" from their book *The Design Agenda*, Rachel Cooper and Mike Press state the importance of strategy as they see it (which we might say is from a neo-liberal perspective):

> "While military analogies may be less appropriate in today's management literature, with its talk of "flatter organisations" and "employee empowerment", business at its heart is a commercial game of war. There is a market territory to be won or lost, price wars to be fought and campaigns to be launched. Perhaps the most durable and critical military concept in management is strategy." (Cooper and Press, 1995: p.103)

They go on to describe the priorities for a top-down approach to corporate strategy:

1. Setting direction: a singular and clearly stated "vision" that is "based upon an accurate understanding of future trends and a realistic view of

how future opportunities can be exploited." (*ibid*. p.107)

2. Concentrating effort: directed by an awareness of "the firm's competitive advantage" (*ibid.* p.107) with "a lean staff and simple structure focussed on a core business" which is the "key to success." (*ibid.* p.108)
3. Providing consistency: a "concentration over time" with "a rational progression in a firm's attainment of its goals" (*ibid.* p.108) for example a tech company iteratively extending and refining a user interface to meet the changing needs of its users.
4. Ensuring flexibility: to "recognise its own built-in obsolescence" and "adapt appropriately" – which might require fundamental restructurings.

Design should, they argue, be in the service of these strategic methods. It helps the firm to "secure a distinctive niche" (*ibid*. p.113), to "survive in a mature industry" (*ibid.* p.116) and to "compete globally" (*ibid.* p.119). Design is, in this corporate model, what gives an additional edge to a firm's battle for competitive advantage, attracting and securing a market so as to sustain profit from products and services for as long as possible.

Design as an essential tool in the never-ending struggle for competitive advantage? That is a simple story. It might fit neatly into a view of the higher education "market" as seen through the lo-fidelity filter of league tables. Higher education might be said to be a "mature industry", in the process of rapid globalisation, and being "disrupted" by technological risks/opportunities. In response to these challenges, such a commercial design strategy might

dominate. As suggested in chapter 1.9 on “why is this a matter of urgency?”, we are now seeing universities experiment with design strategies that respond directly, consciously, to the Browne Report on higher education funding. And this has brought architects and media specialists onto campus – but not in the same way as in the 1960s, they are bringing new design strategies with them (BGS are a good example).

What happens when we go beyond a simple neo-liberal competitive-advantage-driven perspective? What if we are designing *with* people who are at the same time service-customers and the principle creators of the value - in practices, projects and concerns - of the designed place? And what if those practices, projects and concerns are far more oriented towards contributing to the wider community than enriching the shareholders of the company? A place like a University?

Other design strategies are possible, including: guerrilla designing, everyday designing, *ad hocism*, design patterns, ecosystems thinking, thick and thin boundaries, platforms. As will be seen, these ideas may be brought together into a design strategy that is concerned with developing the collective ability of people to do their own designing (with or without facilitation from professional and guerrilla designers). I call this the *Design Capabilities Strategy*, and I argue (more fully in 2.5.4 below) that the IDEO Design Thinking strategy is a form of this approach, more appropriate to the age of platform Capitalism (and developments beyond Capitalism).

In the world of business, David Teece has developed an approach to studying

and improving *competitive advantage* (CA) that goes beyond:

- traditional resource-centric approaches, in which CA is seen as derived from privileged access to physical or intellectual capital;
- game-theoretical approaches, in which CA is seen as derived from playing the right moves at the right time to out-smart competitors in an otherwise undifferentiated market place.

Teece states that:

> "…in fast-moving business environments open to global competition, and characterized by dispersion in the geographical and organizational sources of innovation and manufacturing, *sustainable* advantage requires more than the ownership of difficult-to-replicate (knowledge) assets." (Teece, 2007: p.1319)

The Dynamic Capabilities based view turns its attention instead to "..unique and difficult-to-replicate dynamic capabilities…" which can be "…harnessed to continuously create, extend, upgrade, protect, and keep relevant the enterprise's unique asset base." (*ibid.* p.1319) Translated into the terms of this project, the most important of these "dynamic capabilities" are *design capabilities*, and the Design Thinking approach is a strategy for enhancing and applying such capabilities. Teece's recent work has concerned the examination of the "microfoundations of dynamic capabilities" (*ibid*. p.1321), their variation across firms, and the consequences for CA of these differences. Important aspects of the necessary microfoundations include:

- an aversion to "*ad hoc* problem solving" (*ibid.* p.1321);
- "avoiding bias, delusion, deception, and hubris" (*ibid.* p.1333)
- an "ability to integrate knowledge from external sources…architectural competence" (*ibid.* p.1337)
- designing for autonomous loosely-coupled components (*ibid.* p.1337)
- "managing cospecialization" (*ibid.* p1337)

Although he cautions that beyond these generic points it gets more difficult:

> "…the identification of the microfoundations of dynamic capabilities must be necessarily incomplete, inchoate, and somewhat opaque and/or their implementation must be rather difficult." (*ibid.* p.1321)

The designerly world-view presented in this thesis, and the supporting base of transdisciplinary theory, evidence and practice, gives the necessarily detailed account of a good proportion of the microfoundations for dynamic capabilities in higher education. Considering what I found in my studies of the University, and what we know about successful designing, I have identified three areas in which we can improve the microfoundations and consequently enhance the dynamic-designerly capabilities of the University: design knowledge (of the right kind, in the right format, used in the right way); design values (appropriate to the University and applied to the design process); the organisation of designing (in a way that works with this diverse and distributed kind of institution).

### *2.5.1 Good design knowledge in the right format*

In Part One I argued that a knowledge of the design history of the University is an essential but missing ingredient in the agency and reflexivity of all of its participants. My studies of learning design (at the micro level) and curriculum design (at the macro level) have found the same to be true of less concrete forms of designing. However, *ad hocism*, the organisation of designing in the University and its essentially dynamic nature creates supercomplexities that make it difficult for us to retain and apply design knowledge. What can we learn from design theory and practice to help with this?

#### *Knowing thick and thin boundaries as a guide to design tactics*

I use the word "supercomplexity" in my conceptual framework, linking it to "ill-defined" and "wicked" problems and the emergent organic inventiveness of *ad hocism* and *meshworks* or *rhizomes*. Designers have tactics for designing in supercomplex conditions. The design pattern is one such tactic. But there are many other, often tacit, guidelines and sensibilities that come into play. And furthermore, design theorists are on the look-out for new concepts, tactics and techniques that may be used to help us through these challenges.

In a talk entitled "Expanding Contexts: A Strategy for Super-Complexity"[87], Birger Sevaldson (Oslo School of Architecture and Design) describes new ideas on how we can take-on the challenge of designing for "non-anthropocentric systems". Why should this matter? Sevaldson begins with

[87] Part of a symposium on "Sustaining Sustainability: Alternative Approaches in Urban Ecology and Architecture", February 4th 2012 at Cornell University. Online at http://www.cornell.edu/video/expanding-contexts-a-strategy-for-supercomplexity

two examples of "super-complex"[88] systems: a cup of coffee and an aircraft carrier. We can view both of these very different things in two ways: we might list the physical properties of the object - in which case the aircraft carrier appears to be far more complex of the two; or we can view each as an event within a chain of events and a sustaining and degrading ecosystem – in which case the coffee cup and its contents is a super-complex entity (or event), connecting together already super-complex ecosystems that are more or less "anthropocentric" (more or less controlled by humans for humans). We might extend this into a critique of Capitalism, raising the question of *who does it serve?* – its own post-human future? Returning to Sevaldson's talk, he sounds somewhat like Christopher Alexander:

> "Coping with super-complexity in the design process: we need to get a holistic overview; we need to build necessary knowledge; we need to network and co-create with experts; we need to remember that the central stakeholders won't be able to voice their opinion."

But our understanding of super-complexity has moved on since Alexander's two-dimensional tree/meshwork analogy. Sevaldson is moving towards a way of designing for super-complexity, but first needs to define the problem better.

He shows how in designing, we impact consciously or unconsciously upon "central stakeholders" who cannot influence design decisions now - and Sevaldson is specifically referring to non-human animals, but the principle

[88] Sevaldson hyphenates the term super-complex, whereas in the study of higher education it is written without the hyphen. In just this section I retain the hyphen.

applies to people in the future (for example, a university building will be used by students who are not even born yet). When we design, we inevitably simplify the scope of the problem – when Cross and Lawson talk of generative principles, they mean the selection of a set of issues and characteristics, and the rejection of a different set of possibilities, so as to make designing possible – what Herbert Simon (in the Sciences of the Artificial) called “satisficing” (Simon, 1956). Design decisions then involve a degree of (carefully judged) lock-in – although the degree to which we are locked-in to decisions will vary between different types of design and different approaches (buildings can be designed with different degrees of flexibility and future-proofing, architects like Hamish McMichael and Neil Eaton from BGS are increasingly aware of the need for long-term flexibility).

Sevaldson adds to this the idea of “thin and thick boundaries”, and a technique for boundary-aware designing (I call this an additional dimension of *designerly reflexivity*). When we make design decisions that exclude elements of super-complex ecosystem, we throw a boundary around the designed thing. Consumer Capitalism is very good at doing this – the coffee company might want us to ignore the working conditions of South American farmers and the impact upon the animals of the rainforest. And in doing so, voices (now and in the future) are excluded. We are then designing not just an object but also an “artificial, institutional boundary”. Sevaldson gets this idea from systems theory:

> “In systems theory the environment is defined as the entities that influence the system but that the system can’t influence.”

The boundary then sets up a division between system (coffee) and environment (South America), in which the environment has no agency in relation to the system, feedback is deliberately excluded. He calls this a “thin boundary”, as opposed to a “thick boundary”:

> “We suggest the concept of “thick boundary”. When we look at the complexity in which nature and the artificial is interrelated it seems that ever more stuff takes place within this boundary condition. The boundary appears to be more an infiltrated weave or a gradient than a membrane.”

The thick boundary contains interfaces, time and space for feedback. It is an:

> “artificial, institutional boundary, but operational, they can act upon it”

And it can be modelled as a design space:

> “Diagram of a gradient from nature to built environment, nature to artificial.
> “The Thick Boundary: a multi-layered fabric of interwoven relations. That is our design space.”

But it requires a more sophisticated, less static method, beyond the tree and the meshwork. Sevaldson is developing a multi-dimensional modelling approach called “GIGA-mapping”:

> "…like what is known in the soft-systems methodology as the rich picture approach…we create an artefact that goes beyond descriptive to being generative."

The full details of Sevaldson's methods are beyond the scope of this thesis, however, in addition to the formal system, we can learn from Sevaldson an additional heuristic (which may already be there tacitly in how designers work): when designing be aware of the implications of the thickness of the boundaries that are imposed, employ what Sevaldson calls "boundary critique", and where appropriate, thicken the boundaries with spaces for dialogue, feedback, reconfiguration, everyday designing, and for learning and thinking.

### *Environments, platforms, places and traces infused with explicit design ideas*

This set of concepts points to a different way of understanding and managing supercomplexity, beyond conventional systems theory and recalling the dynamic open systems approach of Buckley, Deleuze and Guattari, and DeLanda.

Sevaldson uses a definition of "environment" from systems theory – "the entities that influence the system but that the system can't influence." This points to aspects of the world that cannot be directly manipulated by design, that subsist in the background and slowly change over time in response to micro-effects on (for example) energy flows and chemical composition. I want to move away from this concept - for example, suggesting that the term Virtual Learning Environment is unhelpful when seeking to engage teachers

and students in actively making use, designing the use of, technologies. Platform is a better term, one used more frequently today by professional designers and by everyday designers thinking about how to make the most of the opportunities at hand. The term has already been introduced as part of my version of assemblage theory, and in relation to my analysis of designed assemblages like the iPhone. But in the context of *designing* today, it also provides the focus for much of our design thinking (teachers and students are actively thinking and forming platforms).

The emergence of platforms, *platform Capitalism* and the (educational) institution as a platform is massively significant – although perhaps not yet widely realised. It encourages a distinctive way of thinking, designing and acting that permeates much of what we do today. My own profession, academic technology, is perhaps a little too obsessed with platforms of the wrong type – but as will be seen, my research has led to the emergence of a different concept: the University and its Extended Classrooms as a platform.

As I discovered in my empirical studies of everyday designing in the University, platforms are matters of great concern and contention: Windows, Linux or OSX? Android or iOS? Java or PHP? Amazon Kindle or old-fashioned-print? When we list the things that might be considered to be a platform, the diversity of the cases suggests a vagueness in the concept. But there is always a constant element to the thought: I have to choose to use, to operate within, to make my things within, one integrated system from a set of possible such systems. Operating in multiple platforms is always more costly (time and effort) than sticking to a single platform. There is a degree of lock-

in. But at the same time platforms give us greater choice and fluidity than before – it's not as if in choosing an operating system one is making a fundamental and potentially life-defining commitment to being either Protestant or Catholic. This is not the 17th Century. And at the same time, these platforms are powerful containers and enablers of cultural and economic (and academic) productivity – Amazon, Ebay, the Apple App Store, the University of Warwick in an age of *platform Capitalism*?

Platforms are systems with relatively thick boundaries - variable depending upon their design and the management and development approaches that are incorporated into them. In the thickness of their boundaries, design is contended, and through those contentions, deep ethical and aesthetic differences are resolved. Their contention is so significant because of the way in which we construct not only our devices out of platforms, but also the persistent, opportunity rich, meaningful *and* open *places* in which we work and live. Platforms make this possible, easy, unthinking and contested, as places for action and reflection. But also as places in which we leave *traces* of our action – as we move across the platform. And increasingly we are engineering platforms so as to record, gather and use these traces – with all of the ethical implications and contentions that implies.

The full importance of the concept of the platform came to me in November 2014, during a presentation by Simon Nelson, the CEO of the Futurelearn company.[89] Massive Open Online Courses (MOOCs) are still controversial in higher education. The Futurelearn company was formed by a consortium of

[89] At the British Universities Film & Video Council annual meeting, 28th November 2014.

British universities, but with the Open University (OU) at the fore. The OU, being one of the first and most successful of distance learning universities, is used to the idea of creating an entirely new platform – a university as a platform. And it is likely that other universities (such as Warwick) are being led into the consortium as a way of keeping in touch with what might turn out to be a new paradigm for the design and delivery of learning. However, what it might also do is to make clearer the fact that "traditional" universities are platforms in the sense defined above. It might make us consider whether they are well-designed, badly-designed or even non-designed platforms – with all of the questions that implies concerning fit, stick, spread and grow. Listening to Nelson describe his own journey to Futurelearn, from leading BBC Radio's podcasting initiatives and then the development of the iPlayer TV catch-up service, it became evident that Nelson does already have in mind Futurelearn as a new platform, not only for the delivery of learning, but for its design and assembly. He described how with the iPlayer he faced the challenge of turning the BBC from a "broadcasting mind-set" to a platform for "making things with permanence, discoverable and sharable". It was more than just a streaming service: "the web can be so much more than just a distribution platform for videos." The web then is a platform for the social consumption and construction of stories, and the useful production of traces. Nelson is very much *story-oriented* (as one would expect from a media professional). He told us that "…the way to engage with people in this media [video] is to tell stories". And as with the iPlayer, so too with the Futurelearn platform. Which is a platform through which academics can more effectively tell engaging stories (mostly in video) – "…high quality video-story-based short courses". And these then, he claims, are the "production skills universities need to

develop." And in these words we can see how whole new platforms, places, and systems of traces get made through a very specific design idea – the teacher-student relationship as storytelling and story-watching.

As an illustration of this kind of platform-centric designing, consider the following two diagrams that I have created for the Extended Classroom project. This was originally prompted by discussions concerning the proposed Teaching and Learning building at Warwick. The proposal prompted us (the Academic Technology Team) to think about teaching spaces and technologies from an integrated perspective, with the aim of enabling greater flexibility in learning designs and access to learning activities. We then started to think about the University as a single unified platform: interoperable, enabling flow across events and formats (for example mixing local and distance students synchronously), a single range of skills and knowledge required to access everything, unobtrusive technologies reducing extraneous cognitive load. Whereas in the past teaching and learning took place in a series of disconnected spaces, physically walled-off from each other, the University as an integrated Extended Classroom platform allows for smooth flow across all times and places. But this does not necessarily mean these new platforms are the right platforms. To know that we need to:

- question their design ideas through appropriate design values;
- engage with a much wider range of people in the process of designing;
- create and critique realistic scenarios describing how this might play out in the future (thinking about future participants.

The second diagram illustrates some of the design values that we think are necessary for such a platform.

# What is the Extended Classroom?

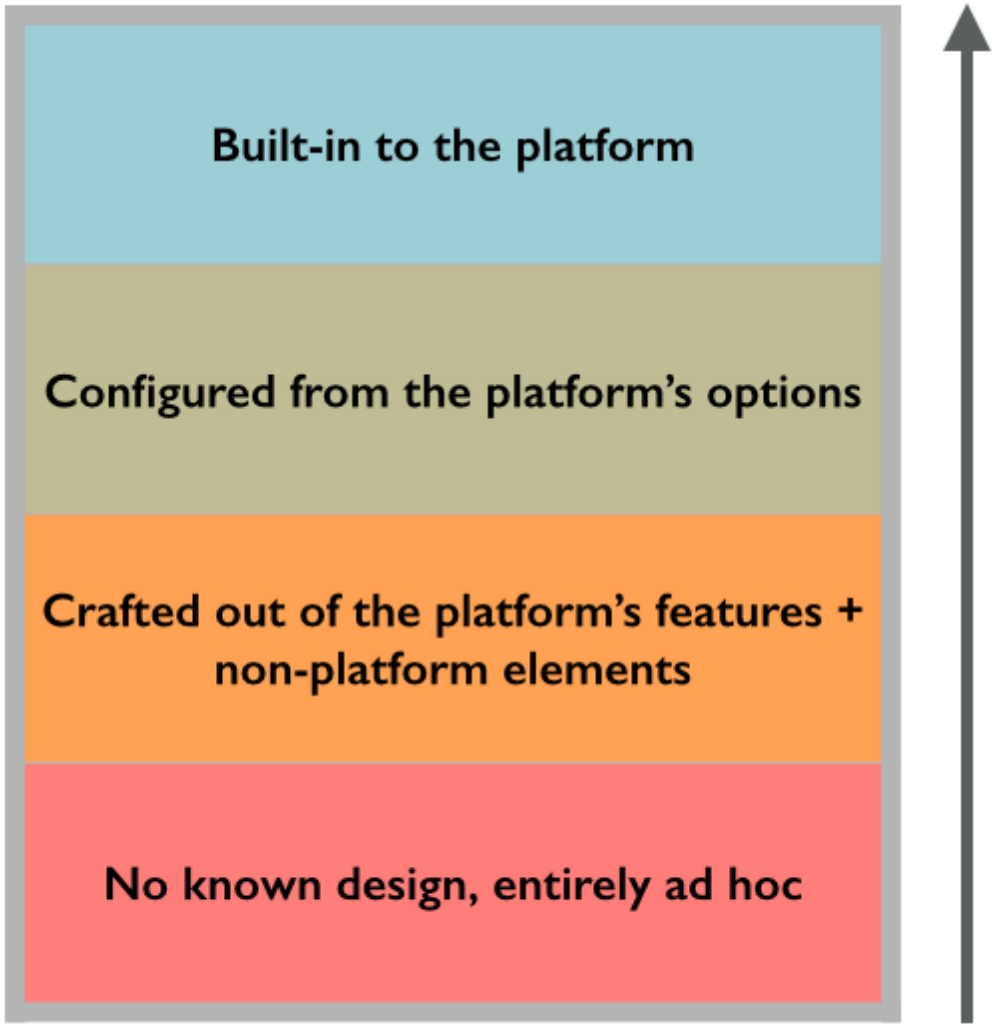

*For some, learning and teaching takes place in disconnected spaces, using different tools, resources and techniques, determined by the constraints of each type of space, often taught by different people in each space - disconnected.*

---

*A set of well-connected digital tools, resources & techniques is becoming available across all kinds of space and time, including virtual. Independent study is becoming more collaborative, more constructive - being replaced by student-led collaboration. All experienced in…*

## A platform-centric approach is essential to the Extended Classroom Project

**ExCl Design Values**
Fast, accessible, reliable, sustainable, supportable, transferable, enduring, recognisable, collective-capability boosting.



### *An active programme of design anthropology and design thinking*

Hopefully, by this point in the thesis, the value or even necessity of such a programme will be clear. An institution's design knowledge, and the means by which it is produced, needs to be cared for. This is not a trivial matter to be approached casually. It is the work of a profession, facilitating a much wider collaboration, valued by the leadership of the institution (this final point is, I argue, the aim of the IDEO Design Thinking strategy).

## *2.5.2 Good design values & values-led designing*

Bruno Latour  is interested in this 'new' kind of designing because it brings people together over contentions and is the means by which we remake the social (Latour, 2008). But the contentions are not always simply prosaic matters - colours, textures, layouts. And not all such simple matters are so prosaic. They can have massive implications – both real and imagined. Designing is a value-laden concern. Values both guide our designing and are built-into designs. And further more, designing with values in mind may often lead to reflection, philosophising even, on those values. Student as Producer and Open-space Learning are prime examples of this. But with a shift to a designerly perspective, further design values will be brought into consideration.

The question of "sustainability" is a good case. Birger Sevaldson's talk for the Cornell symposium on sustainability illustrates the complexities and creativity that arises out of the value-dimension of designing:

> "…sustainability is not just about being green, but also a matter of

> technology, economy, management, culture, politics and markets. When we design something we have to pay attention to the ecology of our clients." (Sevaldson, 2012)

As Cross and Lawson show in their studies of professional designers, people are drawn to designing because of its complex value-laden nature – especially architects, but also increasingly to product, service and community (or social) design. As a philosopher who does designing, I can understand this.

We can further analyse the role of values in designs and designing into two overlapping concepts:

The values that guide the choices that we make in specific designs – aesthetic, environmental, political, religious – value systems that clearly impact upon the outcomes of designing. Emotionally durable design, discussed below, is an especially sophisticated design value. It has, I argue, especial significance in education, and hence is included here as a prime example.

The second sense of value in designing concerns meta-reflexive considerations about how we do designing, how we organise and operate as designers – for example, who participates in designing, and how? Again this is of special significance to education. Its main beneficiaries (supposedly the students) have in the past been kept out of the design process. And now there are many forces and voices calling for that to be reversed.

### *Emotionally durable design*

The concept of "emotionally durable design" is a perfect example of design thinking leading to the creation of new (design) values through a philosophical-practical reflexivity on designing. Jonathan Chapman's concept is also, as will be seen, an especially apt design value for higher education – one which I argue is already operational, tacitly.

An image that I will return to repeatedly is that of the world according to Marcel Mauss, as described by Gatt and Ingold in their introduction to design anthropology:

> "In this oceanic world, every being has to find a place for itself and avoid being swept away in the current by sending out tendrils or lifelines that can bind it to others. In their interweaving, these lifelines comprise a boundless and ever-extending meshwork." (Gatt and Ingold, 2013: KL 3266)

This world-view describes conscious beings (human, non-human, trans-human) seeking to endure by establishing what some design researchers call "thick boundaries" (Sevaldson, 2014) with other enduring beings. We can, without necessarily going into a full exposition of his philosophy, connect this to Bergson's *intuition* of *duration* – the reflexive apprehension, as the basic condition of being human, of being a qualitative multiplicity in the world (growing and changing in time and space) without losing identity (Bergson, 1946). More prosaically, we might interpret the will-to-endure as a basic emotional need to endure *with* the world:

> "…a profound human need: the need for empathy." (Chapman, 2005: p.18)

However, as Jonathan Chapman argues, it is a need that may be satisfied by design in radically opposing ways. Capitalism, for example, paradoxically satisfies the need for endurance through an never ceasing stream of products. As they pass by on the supermarket checkout conveyor, the quantity of the stream feigns a sense of satiation. Quantity simulates the expansion of our qualitative multiplicities:

> "In a world that is ever changing, inert strategic and theoretical models quickly become anti-evolutionary and grossly counterproductive. It is shocking, then, to recognize that the current model of capitalism is based on a pre-industrial revolution worldview dating back almost 200 years, in which the quantity of production equates to the quality of human life." (Chapman, 2005: p.166-167)

Against these powers, the irresistible force of an outmoded response to capitalism, Chapman introduced a different set of *design values* under the banner of "emotionally durable design":

> "A revolutionary consumer reality is born, catalysed by new and provocative genres of emotionally durable objects and experiences that are designed for empathy." (Chapman, 2005: p.18)

The objects and the empathic relations to the world that are made possible through them lead away from the ceaseless churn to a "sustainable realm where natural resources need not be ravaged to satisfy every fleeting human whim and the very notion of waste is obsolete." (*ibid.* p.18) We might have fewer things passing through our hands, but they mean more to us emotionally, attached to our sense of duration.

As we now know, the human desire for duration and for things that promise duration *with a degree of predictability*, is both powerful and potentially destructive (of people, communities, ecosystems and planets). Designers have a special role to play in this, by giving meaning to objects and events for us duration-craving (or as the need becomes displaced by capitalism, consumer-product-craving) human agents.

> "Meaning is not something self-sufficient that lurks dormant within the semantic layers of an object until someone accidentally notices it, nor can it be universally designed or programmed." (*ibid.* p.165)

This echoes Latour's argument for the significance of the concept of design, always leading unpredictably to contention and to the under-determined nature of the human world:

> "…when analyzing the design of some artefact the task is unquestionably about meaning." (Latour, 2008: p.4)

We are led, by accident or by design, into the meaning of things:

> "Meanings are created between people and things, and though designers can endeavour to create and trigger meaningful sensations within users, the explicit nature of those meanings is largely beyond the designer's control." (Chapman, 2005: p.165)

And that is why designing *against* prevailing value systems and assumptions is such a difficult thing to do:

> "This is because users will contort, bend and modify meaning until it fits neatly into their own construct of reality; meanings are unconsciously customized by each user in their own particular way to create bespoke renderings of a formerly mass-produced meaning." (*ibid.* p.165)

Designing to endure emotionally is then not the easy option.

The concept is especially of interest in this context as a *design value* that might fit especially well with higher education, a domain in which people work especially hard to make things endure under supercomplex conditions and against a prevailing consumerism. The challenge of emotionally durable design could be akin to the core challenges of teaching and learning.

### *2.5.3 Better organised design capability & networked designerliness*

The designerly-philosophical question of design values is one of the two key dimensions of design strategy. The second aspect concerns how to organise

designing and the development, maintenance and application of design capabilities. This is closely related to “innovation studies”. However, we need to make clear a methodological issue that is sometimes not well understood. We can ask three questions:

1. How is designing and design capability actually organised (emergently or by design)? – the *descriptive* question.
2. How should it be organised so as to fulfil its projects, following the values and to address the concerns of the people and ecosystems it intends to benefit? – the *normative* question.
3. How can it best be organised, given its present state and future potential, so as to work in a way that meets the criteria of question 2? – the *designerly* question.

There are many possible answers to each of these. But there are also clear associations between patterns of organisation and design strategies – for example, corporate design for competitive advantage and a top-down, studio-centric approach. The *Diffusion of Innovations* approach of Rogers was discussed in Chapter 2.3, and discounted as not applying well to the University. A *design capabilities* strategy requires a more distributed and networked approach to organising design capability – although it seems that is not in itself enough (hence the additional Design Thinking strategy of IDEO).

### *Communities of practice*

When talking with the people who are officially responsible for developing practice in higher education, the concept of “community of practice” crops-up

as a kind of gold-standard, as often as the words “laggard” and “early-adopter” are used in a negative sense. Again, it is often not clear if this is being used descriptively, or normatively – in reality, it is used in a design sense: we can get people working better in communities of practice.

The concept is most famously associated with the work of Etienne Wenger. Although its details have evolved over time, the core principles are quite simple, and compatible with the account of designing developed in this thesis. The practical guide-book *Cultivating Communities of Practice* (Wenger, McDermott & Snyder, 2002) is especially useful in connecting these ideas into design practice. They begin, following Polanyi (1966/2009) with the claim that:

> “…the tacit aspects of knowledge are often the most valuable. They consist of embodied expertise—a deep understanding of complex, interdependent systems that enables dynamic responses to context-specific problems.” (Wenger, McDermott, Snyder, 2002: KL 232)

Their account of the diffusion of innovations, and more broadly knowledge, goes much further than Rogers:

> “Sharing tacit knowledge requires interaction and informal learning processes such as storytelling, conversation, coaching, and apprenticeship of the kind that communities of practice provide.” (*ibid.* KL 235)

However:

> "…what makes managing knowledge a challenge is that it is not an object that can be stored, owned, and moved around like a piece of equipment or a document." (*ibid.* KL 265)

And the solution (which in the 2002 book is explicitly normative and designerly, although they seem to be basing this on a descriptive account of real practice):

> "…communities of practice create value by connecting the personal development and professional identities of practitioners to the strategy of the organization." (*ibid.* KL 293)

And such a community is not organized around conventional corporate organizational structures, but rather develops around a shared set of practices and concerns of people working in similar ways across and between organisations. And responsibility for design knowledge and designing might then best be given to the community of practice and facilitated through networking and forums belonging to the community, using rules emergent from its knowledge and practices.

We can recognize this in the descriptions of designers of various kinds. Professional designers have their trade associations, often backed-up by formal membership requirements (architecture training and certification). But there are, we might argue, communities of designer-practitioners that go across the boundaries between different design professions – in my interview

with BGS I heard how the boundary between architecture and interior design is eroding. And how do guerrilla designers fit into this? We might find that a broader and more inclusive community of design practitioners is emerging, and that could include to a lesser extent everyday designers. There is no reason why a person cannot be a member of more than one such community. Wenger *et al*. have developed their model to accommodate these complexities. Contentions concerning how communities of practice work often concern these details. For example, we might consider the concepts of "legitimate peripheral participation" (Lave & Wenger, 1991) and "situated learning" (1998) as useful ways of understanding how communities overlap and how people become members of one or more community.

### *The creative industries*

During this research project I followed several Warwick graduates as they made their ways through the world of the new creative-digital industries. This gave me an insight into how such endeavours are organised as networks of talented and self-directing individuals, as temporary creative ensembles, and as more permanent company structures. This did not seem to form a tightly associated *community of practice*, there was in fact much diversity and fluidity, perhaps as a natural product of the search for creative innovation and competitive advantage. But at the same time there does seem to be a sense of shared purpose, a collective interest in sustaining the network and the broad pool of talent. The reflexive accounts of managers demonstrated an especially active and meta-reflexive consideration of the issues. Chris Bilton (of Warwick's Centre for Cultural Policy Studies) has researched these ways of thinking and working. He writes that:

> "In fact the challenge of creativity in management is to overcome these stereotypes of novelty and continuity, and to find ways of stitching together or tolerating the paradoxes and contradictions between them." (Bilton, 2006: KL 141)

And that requires looking beyond the obvious, beyond the spin (delight in novelty) and the reaction (comfort in continuity), towards more meaningful and enduring value. This is part of the *designerly* considerations of many of the people in my study. It applies both to the design of products and to the design of the organisations that create products. For example, I found this sophisticated ethic active in the Touch Press educational app development company. There is also a surprising continuity between the organisation and ethic of the University and that of the creative industries.

Touch Press is a classic *creative industries* company, self-consciously working according to practices described by other successful companies - Ed Catmull's Pixar approach has directly influenced their thinking. And Catmull's 2014 book *Creativity Inc.* has confirmed the extent to which the approach embodies the meta-reflexive mode. The models that they use are, they would claim, descriptive of how successful companies and workers operate (although the assessment of these claims is more a matter of judgement than science). They are also normative – people in the creative industries believe that these practices are the right way to work (and there is often an ethical dimension). But most of all they are designerly. As seen in the interview at Touch Press, practitioners actively reflect and improve their methods. They deliberately organise themselves into small companies, with diverse talents,

embedded into the kinds of broader ecosystem described by Bilton – seeking out physical and online locations to connect with best possible pool of talent and ideas.

### *2.5.4 The Design Thinking Strategy*

The IDEO brand of Design Thinking, derived from the work of the global IDEO design consultancy, is an attempt to bring practices from the creative industries to bear on the problems of encouraging and managing design innovation under supercomplex conditions of the kind discussed in this thesis. It promotes what I call a *designerly turn* in all kinds of organisation, where design capability becomes a valuable asset distributed throughout the organisation and beyond.

#### *The designerly turn – Design Thinking as strategy, method and values*

Design Thinking is a *designerly turn* - a call for people (in businesses and institutions) to stop using, for example, optimisation-oriented management-thinking or technocratic-gadget thinking, as the default response to hard problems (which may have been caused by those modes of thinking in the first place) or to make the most of creative opportunities - a call to turn towards design. Optimisation and technological-thinking have their places, but they cannot be the sole basis by which we aim to improve our ways and our world.

As Leonard and Rayport (1997) observed, optimisation-oriented approaches are of little use for discovering significant innovations. Businesses are often blind-sided by optimisation, getting better and better at making things that might in fact be heading towards obsolescence, or which are holding people back, locked-in to repeat unhelpful ideas and patterns of behaviour. Brown agrees:

> "Because business systems are designed for efficiency, new ideas will tend to be incremental, predictable, and all too easy for the competition to emulate." (Brown, 2009: KL 275)

The same is sometimes true of technology-focused people, who may suffer by becoming too narrowly focussed upon the sharpening down of a narrow range of behaviours around a narrow set of tools. Technocentric approaches to innovation are another variety of this lack of imagination:

> "A purely technocratic view of innovation is less sustainable now than ever, and a management philosophy based only on selecting from existing strategies is likely to be overwhelmed by new developments at home or abroad." (Brown, 2009: KL 78)

They cannot easily deliver worthwhile innovations, they cannot help us to escape from just proceeding down the same old pathways.

Design Thinking offers something else.

### *Design Thinking in education, healthcare and social enterprise*

IDEO's work is itself already bridging the gap between two domains that, conventional wisdom might assume, are separate or even opposed: business and social enterprise. By 2009, IDEO's work in health care and KS12 education in the USA was demonstrating how their *deep* version of participatory designing could bring together poorly-connected or even antagonistic stakeholders (who might not see themselves as stakeholders), forming a kind of community of designers connected both through an

ecosystem of interests and practices that define their domain (e.g. a health care system) *and* through a designerly community.

There are many great examples. Perhaps the most impressive is the story of how Doug Dietz (principal designer at GE Healthcare) formed a design collaboration including children, nurses and child development experts to redesign MRI scanner environments - following the IDEO approach.[90] The resulting environments are child-friendly, non-intimidating, and include interactive features that encourage the child to lie still - meaning that a much smaller percentage of children need to be sedated for scanning. Dietz describes the impact of the designs as "turning the experience into a smaller speed bump" in the lives of the families using the service. The Jungle Adventure MRI environment (at the University of Pittsburgh Hospital), for example, transforms the scanning table into a canoe, which then appears to be lowered into 'the water'. A pathway of rocks leads a meandering path from the entrance of the room to the canoe. Once in position, if the child stays still enough, fish (projected) start to leap around over their heads (genius). The transformation is of the kind that children perform in their role-playing imaginations - what Dietz calls the "three chairs and blanket mode" in reference to the way in which children take simple props and turn them into a place and a narrative. At TedX San Jose 2012, Dietz described how a focus upon empathy and play in designing made him aware of the serious deficiencies of his original design, helped him to understand the challenge

[90] From the TedX talk by Doug Dietz on "Transforming Healthcare for Children and Their Families" 2012
http://tedxtalks.ted.com/video/TEDxSanJoseCA-2012-Doug-Dietz-T

from the child's perspective, and led to the complete transformation of the MRI environment.

There is, I argue, a radical idea in Design Thinking (although not unique to IDEO). Design collaborations are explicitly oriented towards the production of better designed things (objects, processes, events, communities etc.), and ways of using such designs. IDEO is a design consultancy, it gets paid for creating great designs. GE Healthcare benefit from the work of Dietz in reinforcing their position as the premier healthcare systems provider. A design consultancy's reputation is built upon such outcomes. However, Tim Brown (CEO of IDEO) is keen to convince us that there has to be more to it than that:

> "…an approach to innovation that is powerful, effective, and broadly accessible, that can be integrated into aspects of business and society, and that individuals and teams can use to generate breakthrough ideas that are implemented and that therefore have an impact." (Brown, 2009: KL 85)

Design Thinking then goes beyond the conventional design studio. How does it do this? There are, I argue, three levels of *participatory design*, leading at the deepest level to greater care for and appreciation of the impact of design in people's lives (for example, the design of healthcare systems for children becoming a high priority for government and managers), and the development at an institutional and a societal level of a more capable design capability:

> "Design thinking takes the next step, which is to put these tools into the hands of people who may have never thought of themselves as designers and apply them to a vastly greater range of problems." (Brown, 2009: KL 90)

### *Characteristic practices*

We might initially recognise Design Thinking through its methods. IDEO's Tom Kelley describes many of them in his helpful guide book *The Art of Innovation* (Kelley and Littman, 2001). The section entitled "Make Your Junk Sing" illustrates the eclectic nature of IDEO's design practice. An accompanying photo of Dennis Boyle's "corner" says it all. Dennis has the perfect collection of stuff:

> "As the head of one of our most celebrated studios, Dennis became known as the keeper of the files, the stuff, the slides, the boxes. Circuits, fasteners, exotic plastics, unusual glass, oddly molded parts – you name it, Dennis had it. As a Stanford lecturer, Dennis often lugged around a cardboard box to show his students. He called it the "magic box" and told his students that engineers should make a practice of collecting interesting things that might one day prove useful." (Kelley, 2001: p.142)

Tom Kelley's book is full of wonderful ideas and useful advice. It is a catalogue of Design Thinking methods. But that is not the whole story. Tim Brown's later publications have a different focus. Brown positions those

methods within a strategy (for business and for society), for dealing with a wider range of challenges than design's conventional remit allows, and in the context of a deeper concern for design and how we construct our world.

### *Hands-on thinking*

The nature of designerliness today has been, and continues to be, extensively researched and debated - there being a descriptive task: *how do professional and everyday designers design?* and a normative task: *how should we do design?* Design Thinking is an addition to these debates, aware of (but not academically referencing) design research. Design is as such a highly reflexive discipline, with a growing self-understanding and confidence, as expressed by Brown and many other published designers.

This reading of the Design Thinking phenomena as a *designerly turn* (an event) also resolves one of its contradictions: Brown, following his colleague Tom Kelley (General Manager), emphasises the *hands-on* nature of designing. Kelley argues that "lo-fi prototyping is the shorthand of design" (to paraphrase his 2001 paper on that topic). Brown talks about "ideation" being one of the three essential areas of activity in a Design Thinking project - but it is "ideation", or the processes of discovering, creating and testing design ideas, through largely hands-on means. This concurs with Donald Schön's well known description of designers working through "a reflective conversation with the materials":

> "Their designing is a web of projected moves and discovered consequences and implications, sometimes leading to reconstruction

> of the initial coherence - a reflective conversation with the materials of a situation." (Schön, 1986: p. 42)

But we are told that we need to do Design Thinking? Lucy Kimbell, in her critique of Design Thinking, is correct in arguing that:

> "Practices involve bodies, minds, things, knowledge, discourse, structure/process and agency and, importantly, cannot be considered by taking one of these elements in isolation." (Kimbell, 2009: p.8)

and:

> "…descriptions of design thinking that focus on individual designers and cognition fail to account for the situated nature of knowledge production and the institutions that serve to validate it." (*ibid.* p.9)

But Design Thinking, as described by Brown, is social, situated and transversal (a complex assemblage of the diverse entities and systems named by Kimbell). What is going on? Is this paradoxical?

My interpretation is this: Design Thinking starts with the Design Thinking thought, realisation or reminder: Think Design! (semantically this is akin to the adverts that urge car drives to Think Bike!). We then think in a designerly way, which amongst many other things, has a strong hands-on component, in which thought and practice are combined, or not separated - perhaps breaking out of the mind-body dualism inherited from Plato, through

Descartes and the Enlightenment, and expressed with destructive consequences in the Industrial Age.

### *The three spaces approach*

A designerly organisation is founded upon some fundamental design capabilities, belonging to and actively used by all participants in the organisation's processes and places (whether they be responsible for big or small changes, or the maintenance of a process as is).[91] There are skills involved in this. For example, the ability to quickly sketch a design (as a representation of form or process). But the actual skills used to achieve effective design vary considerably (in some cases storyboarding is a better skill to use than sketching). Instead we should think of design capability as the presence of conditions (skills, opportunities, ideas, social organisation etc.) that enable three key aspects of design to occur: inspiration, ideation and implementation. Tim Brown (managing director of IDEO) describes the three aspects of design capability in his book *Change by Design* (Brown, 2009), summarised in his influential *Harvard Business Review* article "Design Thinking" (Brown, 2008). Brown talks of these as being the **three spaces of innovation**.

This is more than just an analogy. **IDEO recommend establishing three interconnected physical spaces in which these activities occur.** As such, these physical spaces act as repositories for design knowledge and as places in which everyone is welcome to contribute *following the different protocols*

[91] This section originally appeared in my working paper on "Innovation and design change strategies for learning technologies at Warwick" at http://wrap.warwick.ac.uk/56684/

*for each type of space* (for example, the inspiration space is open and non-confrontational).

The spaces are like this:

**Inspiration**:

In this space we build a rich picture of the organisation (course, module, or whatever scope we are working at), its people and practices, as they are, as people might want them to be, as they are becoming. This must be realistic, not just a showcase of nice stories. It is combined with stories and design examples from other organisations and domains that might usefully enrich the mix.

In their analysis of the design capabilities of university teachers, Peter Goodyear and Lina Markauskaite introduce the concept of “epistemic fluency” to describe how good teachers are able to inspire their designs by understanding how different ways of knowing are active in a teaching-learning collaboration (Goodyear & Markauskaite, 2009). The Inspiration Space is the place in which epistemic fluency (and other kinds of empathic design capabilities or fluencies) is exercised. It generates and refines the design challenges that drive innovation, by expanding insights into detailed accounts through observation. In the interviews with successful innovators at Warwick it was clear that they each had their own rich and detailed "inspiration spaces". However, this important knowledge remains largely locked away in their heads. The IDEO three spaces approach is a way of drawing out that wealth of experience and learning. Most importantly, the space has to be open and

valuing of all perspectives.

Empathy is a key product of the activities in the space, with all participants gaining a better understanding of each other's perspectives. IDEO post strict rules of behaviour at the entrance to the inspiration spaces that they set up in the buildings of their clients. The professional design team plays a facilitating role in this, using creative approaches (e.g. story-building), ethnographic methods, design research, documentary film making - whatever techniques add usefully to the mix. The Open-space Learning pedagogy developed at Warwick fits well with this. As some of the case studies demonstrate (most radically George Ttoouli) and the literature confirms, in a university in many significant cases the Inspiration Space will be quite a challenging space, tied closely to deep issues concerning subjectivity, identity, the individual and the community as produced and as producers. The role of students as participants in Design Thinking is more than essential. As has been demonstrated, the Student as Producer approach must include the Student as Designer and Leader in a non-trivial sense.

**Ideation**:

The insights, observations and empathy created in the Inspiration Space should, often with careful facilitation, turn into design challenges. Ideas for responses to the challenges might emerge quickly, or we might need to prime ideation through the generative power of design patterns. In either case the aim of the Ideation Space is to generate a wide range of possible design responses, and to take them as far as necessary so that ideas can be appreciated and evaluated realistically. There are three essential ingredients

to success in this:

1. a capability for creating and testing prototypes that are just good enough (lo-fi prototyping);
2. a sufficient deferral of issues concerning technical implementation, giving us room to think more freely;
3. the right kind of attitude, prepared to create ideas but not being too precious about their critical appraisal.

In all of this, speed is essential. Whereas we might slowly build the contents of the Inspiration Space over time, Ideation activities fit well with a workshop format. In an article entitled “Prototyping is the Shorthand of Design” (Kelley, 2001), IDEO’s Tom Kelley describes what these workshops are like, and most importantly, the necessary environment and the way in which the Ideation Space facilitates lo-fi, throw-away prototypes becoming embedded into the wider organisational dialogue and memory, so that they can be recalled or reactivated as the exploration of the Inspiration Space grows. This is where design patterns fit. The nature of the Ideation Space is perhaps best encapsulated by Nigel Thrift in this description of new kinds of collaboration aiming to embed “systematic knowledge” (abstract design ideas) into tacit knowledge (design embedded into practice such that it fits, sticks, spreads and grows):

> "...construct quick-fire 'instant' communities by drawing on bodies of understanding which allow these communities to both be founded and have grip, in particular by making systematic knowledge tacit through

> the various means systematizing tacit knowledge that can now be found and applied" (Thrift, 2008: p.91).

The challenge that we face in higher education is, as has been seen in the case studies, the kind of rapid fire experimentation, creativity and reflection/reflexivity required to make this work, is dissipated across many unconnected places and events, and only joined together loosely by innovators of the kind represented in the interviews. Furthermore, the Ideation Space (and the Implementation Space) must be able to draw as needed upon the rich data of the Inspiration Space. A Three Spaces approach, with physically preserved spaces containing all the work on a design investigation, is a way to gather this learning and creativity into one place.

**Implementation**:

Finally, things have to get implemented. And this needs to be seen to be a reality right from the start of a design project. People will not participate without a strong likelihood that their work will have a result. The Implementation Space is perhaps more like a traditional Project Room, with engineers, project managers and change management. The separation of Implementation from Inspiration and Ideation is, however, essential for the kind of emergent, less constrained design and innovation ideas to emerge, to bubble-up into the Implementation Space, where the difficult process of making it happen, of acquiring and deploying systems and supporting change happens. We must not rush to decide on what should be implemented and how it should be achieved before sufficient work has been done in the Inspiration and the Ideation spaces. Once we do launch into Implementation,

we need to keep revisiting the Inspiration and Ideation spaces to keep checking that we are doing the right thing, and to keep the difficult Implementation process fired-up with connection to and support from the community that it serves.

### *Design Thinking is transdisciplinary and requires multi-disciplinary teams*

Looking at this from another perspective, in his book *The Ten Faces of Innovation* IDEO's Tom Kelley (with Jonathan Littman) talks about the richly varied but well integrated teams of different people needed for successfully implementing these approaches - forming a full and cohesive design capability. Kelley arranges the ten faces into three personas:

The Learning Personas:

- Anthropologist;
- Experimenter;
- Cross-Pollinator.

The Organizing Personas:

- Hurdler;
- Collaborator;
- Director.

The Building Personas:

- Experience Architect;
- Set Designer;
- Storyteller;
- Caregiver

These ten are well represented in the university, although perhaps rarely in the same team using their capabilities to full effect.

### *An example of Design Thinking in the University*

Drawing this all together, a simple example illustrating how the Design Thinking approach works to enhance two dimensions simultaneously, the design investigation or project and the designerly community and career:

We might get an idea that there needs to some development done to use technology to increase and democratise participation in seminars. That's not yet a fully stated design challenge, much more work has to be done; so we take that as the initial "frame" for the design investigation (as designers say). We set up the three spaces in an easily accessible location and start to bring people in or go out and observe. The inspiration space fills up with detail and we start to draw out the basics of possible design ideas. We prime the prototyping process with workshops, including a good range of students and seminar tutors, with activities that allow them to realistically build and test ideas. Over time the ideation space fills up and some designs (not necessarily a single solution) emerge as likely candidates around which a consensus builds. We invite the wider community in to evaluate the prototypes. Perhaps the prototypes first become hi-fi and we get people to use them in the field, observing their use to add further detail to the Inspiration and Ideation spaces. During the process there is a towards increasing implementations of designs (again not necessarily a single solution), as they are taken into the Implementations Space and made real. The success of the new designs (fit, stick, spread and grow) is more likely, given their emergence from a very wide

community of participant designers.

At the same time, through a set of simultaneous or subsequent design investigations, along with design use and change in everyday practice, people develop, as individual careers and as communities (networks more or less loosely connected). Consider the case of an early career academic. They are adopting, adapting and even creating designs as part of the steep learning curve they face in building a career in academia. They might also participate with varying depths of involvement in Design Thinking activities, dipping into Inspiration Spaces to learn and to contribute, and perhaps taking part in the lo-fi prototyping of new design ideas for seminars. This could all happen in a disconnected and un-reflected way. But as we have seen, design change and innovation are powered by designerly people connecting together their experiences over time, reflecting and building design values, projects and practices. Five things are important:

1. experiencing and remembering designs in use including the problems that they raise;
2. reflecting upon these many different experiences;
3. abstracting (formally or informally) patterns and generating new ideas;
4. sharing those experiences, reflections and ideas with others;
5. finding ways of putting ideas into practice.

# 3. Conclusions

In this research, a transdisciplinary synthesis and extension of design thinking was created, leading to a comprehensive and philosophically grounded “fit, stick, spread and grow” framework. Higher education teaching and learning is seen in a new light through this lens. The framework was built using insights from design research, architecture, innovation studies, computer science, sociology, higher education pedagogy studies, business studies and psychology. The research was further enriched and empirically grounded through case studies and design studies, in many cases co-developed with participant staff, students and alumni using techniques from “design anthropology”.

In Part One of the thesis, the University of Warwick was explored as a supercomplex organisation, following Barnett (2000). Supercomplexity was shown to have positive consequences for individuals with already well developed design capabilities – in that they can more effectively exploit opportunities and create networks. But for the majority, it presents significant challenges. This creates a design divide which limits the spread and growth of innovations in teaching and learning. Part Two moved on to the positive task of creating a framework that examines and defines the nature of: design, designing, designers, designerliness and design capability – on both an individual and collective basis. Most importantly, the framework emphasises the value of people with the right *design capabilities* (built on skills, knowledge, techniques, values, attitudes and reflexivity) working in effective collaborations (at the right scale and scope) and through well designed and

maintained platforms (including the idea of "the University as a platform" introduced in 2.1.1). Process matters, but people make and maintain the process (learning from Pixar's approach, as described in 2.3.2). The research then considered challenges in managing design capability (especially *ad hocism*) and people-centric strategies for more designerly designing (including Design Thinking, the Thick Boundaries approach and practices from the creative industries). Throughout Part Two, the framework was applied to the task of rethinking the University and its production.

The **fit, stick, spread and grow** framework was shown to be a simple but powerful set of concepts for easing the transition to *designerliness by default* and more evenly distributed design capabilities.

Less positively, this research has shown that yes, as forecast by the likes of Barnett (2000), post-Browne and in the world of globalisation, digitisation and personal flexibility, the neo-Kantian University seems to be in trouble. It is not well equipped to deal with the supercomplex conditions that it has, to a significant extent, created. It sometimes reacts to disruptions by seeking to reproduce an organisational architecture and ways of working that are adaptations of Kant's 18th Century hierarchical design (in *The Conflict of the Faculties* – see 1.8.4). It does not have what Teece (2007) has called effective *dynamic capabilities*, and which I have shown are founded upon the *designerly capabilities* needed for success under such conditions (see 2.5 for Teece's insightful list of "microfoundations for dynamic capabilities").

The investigation found that:

a) The University of Warwick is characterised by a non-deterministic *emergent* growth of many and varied *artificial* forms and features. As described in 1.2, the history of the University began with bold design ideas handed-down through the intentions of an elite group of powerful agencies outside of academia. However, this took place just as the prevailing powers of British Industrial Capitalism crashed into almost terminal decline. The influence of these initial intentions quickly disappeared as the institution's many distributed and disconnected agencies took on a life of their own – often very productive and internationally significant lives – feeding into the overall success of the institution, but not conforming to a single simple design idea or socio-political agenda. Such diversity is not *a priori* a bad thing. It enables the kinds of flexibility, innovative thinking and action described in 1.3 (Student as Producer, Open-space Learning). In many ways the supercomplex University has been a precursor of the growth of supercomplex Platform Capitalism, and a *reflective practicum* in which we can learn how to live successfully, fairly and sustainably under such conditions – perhaps even pointing towards something beyond current political and economic regimes (the SIBE student collective being a good example of this, detailed in 2.3.4). We are, after all, affecting the formation of generations of workers and citizens who will still be active in fifty years time: 2065. In the years after Browne, there has been a resurgence of interest in a design idea for the future of the University, as presented by Vice Chancellor Thrift and the current redevelopment of the campus. This has translated into major building and development projects that have already made a significant mark

on the shape of the campus landscape, but not necessarily yet upon the more extensive and less visible “learning landscape” of everyday teaching and learning (1.9.1).

b) The design history of the University may be recovered as a story of many periods of rapid growth, change and the reworking of places, systems, organisations, curricula and roles (for example the reworking of the History curriculum described in 1.9, and the images of “grafted-on” spaces in section 2.1.2 on assemblages and platforms). The long view is punctuated by the influence of government reviews and policy change. But perhaps now as the politicians’ grip upon the definition and control of “the platform” in which we live our lives loosens, and the emergence of new platforms and powers accelerates, a new order is coming in to place.

c) The task of writing a design history is difficult, as a result of the widespread loss of institutional design memory – only now being recovered through oral history research or by accident. Such memories enable resistance to the imposition of unrealistic or undemocratic design narratives and big ideas. This might concern big details, such as the placement of buildings in the landscape. But small details can be just as significant – for example the memory of the value of sofa space for students needs to be cherished (1.9.4). The recovery of design history knowledge is critical to our collective future.

d) Despite the occasional times at which concentrated organisational change occurs, design agency concerning the where, when, how and what of teaching and learning is highly devolved – with teaching staff and students (through the different influences of Student as Producer

and flexible learning) taking more responsibility for decisions and in many cases producing fresh design innovations. This has been encouraged and accelerated by centrally funded projects and the growth of a “Warwick approach” – with the Reinvention and CAPITAL Centres (now IATL) playing a significant role in empowering students and teachers. Designerliness, and an appreciation of the value of design history and knowledge, was found to be more than usually strong in these initiatives (recall for example the interviews with Carol Rutter, Nick Monk, Paul Taylor and the pedagogic innovations of Cath Lambert and Ruth Leary in 2.1.2).

e) There are no consistent central points at which academic or managerial design agency and capability are collected and maintained by default – a complex committee system and a paper-form-based “quality assurance” process have dissipated and limited its growth and spread. Warwick also lacks a design school of any kind, through which the critical and creative force of design theory and research might be brought to bear on the development of the University.

f) Although there are many variations across the University, it is still largely divided between craft-collectives and the central administration, with the former loosely connected to the latter. Academics are often oriented more to resources and organisations beyond the institution. The diagrammatic representation of Scenario 3: “web sites create unstable and contested common ground”, in 2.2.4 illustrates a compromise situation achieved through new technologies and media. The inventiveness of this craft activity may often be described as a form of *everyday designing*. But there is in reality much less

recognition of the designerliness involved in the work of students and staff.

g) There is also a preference for *ad hocism* – a tendency to favour situations in which we can plan less and improvise more (the Open-space Learning approach takes this to the extreme). Campus-based academic activity finds its value in such live and unpredictable encounters. As seen in the cases presented from Theatre Studies and the Writing Programme, successful academics have crafted departmental places, spaces and cultures that enable exciting and emotionally enduring experiences, containing a high degree of *ad hocism*. Even where a highly specified curriculum is imposed from professional bodies (e.g. medicine) it is interpreted through the lens of individual creative-critical creativity and chance (as theorised by David Davies, see 2.2.2). Although Teece warns against *ad hocism* (see 2.5), in the higher education context it is not a bad thing in itself. Individuals may become highly adept at being responsive and inventive. And given the right conditions, *vertical diffusion of innovation* might flow productively between closely associated staff and students – producing designs that fit well locally and prove to be sticky over time. But this *ad hocism* does tend to fragment design dialogue across the institution (adding to the supercomplexity of the student experience), disrupting *horizontal diffusion of innovation* (reducing spread) and our collective capability for design innovation (reducing growth). These effects result in a reduction of the "…ability to integrate knowledge from external sources...architectural competence…" (Teece, 2007: p.1337) possibly even leading to "...bias, delusion,

deception, and hubris…" (*ibid.* p.1333).

h) The tendency to *ad hocism* and the organisational history of the University contributes to the continual production of diversity through un-directed drift and conscious design innovation.

We might follow Barnett in describing the diversifying effects examined (points *a* to *h* above) as "supercomplexity". If we consider designs as complex assemblages of many components of different kinds, using the approach outlined in 2.1.2, and if those components are increasingly decomposable and reusable in the hands of active agents, then we can see both the source and the effect of supercomplexity in the diversity of educational things that are made in the University (and described in this thesis). Indeed as Barnett forecasted in 2000, these conditions present increasingly difficult daily challenges to individual members of the University (students as much as staff) and to collective attempts at enhancing teaching and learning. The "extraneous cognitive load" involved in negotiating supercomplexity is in itself a major challenge (for example, labyrinthine web sites produced by contending tribes across poorly mapped out and constantly shifting territories, as described in 2.2.4).

A minority of already well-equipped individuals (staff and students) are self-organising so as to exploit the many opportunities that have opened-up. Diversity creates work! The E-Squad benefited in this way (see especially the work of Catherine Allen detailed in 1.9.3). As seen in many of the cases presented in this research, these already well equipped individuals bring creative and designerly capabilities with them from outside of academia. They

are good at creating assemblages from the components made available by the platform (or multiple platforms interwoven together). They combine technical capabilities with imagination and creative strategies, including managed risk, storytelling, lo-fi prototyping, visual representation and networking (techniques shared with professional designers). They are able to understand and work with the unpredictable exigencies of events going between design-in-mind, design-as-experienced and design-in-use, in the every shifting dynamic of discovery, innovation, adoption, adaptation and reinvention. And most importantly, their designerliness is double: producing designs for achieving their goals, and at the same time producing an environment, an ecosystem, of designing (including platforms, networks, working spaces) that enables and enhances their designing.

One of the most fascinating characteristics of the University is the regularity with which talented individuals emerge *from almost anywhere in the organisation* (staff and students). But the unpredictable source of this stream of talent is itself determined by an unevenness in the distribution of *dynamic capabilities* – including the increasingly important (in a world of platforms) *design capabilities*. The University is not so much a “talent factory” (Ready & Conger, 2007) as a talent magnet, attracting and facilitating already capable individuals with the offer of *opportunity*, and retaining them until they generate enough personal strength to escape the pull of the institution. There is then a significant *design-divide* between this minority and the majority.

We should be concerned that an increase in flexibility (the where, when, what and how of teaching and learning), driven by technological developments,

might exacerbate this supercomplexity, its challenges and the resulting design divide - for example, by removing the familiar pedagogical template of lecture-reading-seminar and replacing it with teaching and learning radically distributed across time and space (recall the painful transition from face-to-face to online learning, and Jon Dron's analysis, and we get a sense of how radical this can be – see 2.1.3 on functional designs, breakdowns and the imperative to design). Some people will exploit the changes well. Others will not.

At the same time, and often allied to technological change, the wider HE environment is subject to political and economic turbulence, to which those with highly-impactful design agency (controlling big budgets) are consciously responding and perhaps seeking personal gain. However, more advanced platform-centric developments are on the horizon that threaten the economic, social and political conditions upon which the University has grown: typified by MOOCs (see "Platform wars: distance learning and MOOCs" in 2.1.3), but in the form of the wild, self-organising, self-serving world of Platform Capitalism, even further from the grasp of conventional higher education.

The University is characterised in my findings by its lack of conscious strategy for developing and sustaining the design capabilities of the institution and its members. However, a small number of *guerrilla designers* are responding to changing opportunities by seeking more sophisticated design capabilities, through a more platform-centric basis, and consciously aiming to develop people as much as products. They seem clear on the fact that such platform-centric development must be designed to cope with the preference for *ad*

*hocism*, diversity and devolved design agency. They are still largely unrecognised and unsupported. But their voice is growing stronger.

The positive conclusion of this project is then that there are many people within the University, often isolated and without significant power, who do have well developed *designerly capabilities* – essential to the dynamic capability of the institution (2.3.3). Furthermore, some of these people are conscious of the need to collectively develop these capabilities through platforms and networks that facilitate other people. They are taking advantage of the many opportunities enabled by supercomplex and fast changing conditions – especially technological developments. And they are seeking to empower others to follow: guerrilla designers, joining up with professional designers or adopting-adapting approaches from professional design, and helping to grow everyday designers.

This is starting to look like the "designerly turn", but as yet such a turn is not at the core of the University. A lack of dedicated, sustained support for distributed participatory design capabilities means that design agency is degraded. The lack of dedicated *physical* design spaces of the kinds described by Tim Brown (2008) is a major blocker (2.3.3 on the guerrilla designer's solution and 2.5.4 on the IDEO approach). The continued diffusion of design agency through the committee system illustrates that the University is not yet a designerly institution at the core.

What can be done to go further, faster, before other platforms emerge that seriously threaten the University? The proposal, strongly supported by the

findings of this project, is that the **fit, stick, spread and grow** framework provides a simple, more flexible, easily applied set of concepts through which we can all describe, understand, evaluate and, most importantly, enhance the institution's collective design capability. Most importantly, using it balances the four essential aspects. As with the Design Thinking of the IDEO company, it is not intended to be another "design process" or a "project management template". It is a set of pointers, drawing attention to four essential dimensions in reflection and action through design.

The **fit, stick, spread and grow** framework presents a means for looking beyond supercomplexity to shared values immanent to designing and design agency in the University. It provides concepts, tools and the essential shared language upon which the University may become *designerly by default*. It helps designers of all kinds (everyday, guerrilla and professional) to clearly state and question the aims of designs and design changes – do they fit with people and their developing needs? How are the needs of different individuals balanced with each other now and over time? With these questions more clearly raised into the collective consciousness, more sophisticated design methods such as Birger Sevaldson's *thick and thin boundaries* and Jonathan Chapman's *emotionally durable design* can be introduced. The framework considers what it would take to change and sustain new behaviours enduring over time with an appropriate degree of stickiness and flexibility, again leading to a clarity in understanding the challenge and the use of more sophisticated levels of analysis. The two additional dimensions that help us to care for and develop design capability are: spread – which considers the wider impacts and usefulness of designs, and their reusability beyond our

local case; and grow –how the characteristics of design changes undertaken now can make it easier to successfully design in the future. Such higher level community or platform centric considerations then may work as the basis around which less fragmented designerly networks are formed across the whole institution.

## *Postscript: the Extended Classroom and students as design consultants*

My own practice as an academic technologist has been fundamentally transformed by this research. In February 2015, with many academics still recovering from the Research Excellence Framework (REF) evaluation process, a collaboration of professional and guerrilla designers from across the University designed and implemented the Extended Classroom initiative, applying the fit, stick, spread and grow framework. The idea of the Extended Classroom *reframes* learning technologies and flexibility-enabling techniques for the specific context that is Warwick: predominately face-to-face and campus based, *ad hocist*, and facing problems of scale (increase in numbers), scope (increase in the diversity of its activities) and expectations (in a global marketplace with every detail of the Warwick experience exposed via social networks) – supercomplexity. The Extended Classroom is explicitly *not* about distance learning, a more usual starting point for learning technology developers. It is framed as being appropriate to a campus oriented University with *ad hocist* tendencies. This reframing of learning technology is the result of a more sophisticated and reflective dialogue concerning *fit*. We have recognised the contrast between a minority of “usual suspects” or “early adopters” who have been constantly demanding fresh

innovations, and the majority of people who prefer to *stick* with enduringly familiar, comfortable and effective practices. We began by *re-describing* a small set of generically useful learning technology services (tools and platforms wrapped into service provisions). For each of these we proposed clear and meaningful *value propositions*. For example, for the Lecture Capture service: “Listen again, understand more”. The first step was to take people beyond *awareness* to *recognition* linking technology and innovation to their own practices, ambitions, values and needs. The existing design consultancy and service provision would then be available to assist people in adopting-adapting practices and innovations, which would *spread* more evenly to more everyday practitioners. And furthermore, *spread* and participation in the design dialogue concerning the development of future services and practices, would be accelerated as many more people moved from mere awareness to being *informed advocates*.

We described this approach to senior management as an “organisational learning and design loop” (using the diagram included below) – a key lesson learned in this research project has been the need to see “organisational learning” (or the production of design knowledge and design values) as inseparable from designing. It is a kind of positive feedback loop that results in the design and re-design of “The Platform”, which in this case is the University as an Extended Classroom, bringing together the wider learning landscape, learning spaces (physical, digital and blended), learning designs and curriculum designs. However, progression around the loop should also build networks and communities of designerly practitioners, engaged in the design process. Adoption/adaptation must, to make this work, lead to

continuation/reflection (as in the diagram) – not just use, but continual designerly reflections and reflexivity concerning use. This needs to be facilitated well, becoming habitual for the organisation. The IDEO Design Thinking process, with its emphasis on building design capability for the long term (beyond individual projects) is essential to this. Only when participants are able to advocate designs (or suggest design changes) based on this design knowledge, gained through practice and reflection (the double-loop learning described by Chris Argyris, 1977) will we have well-informed advocates and design participants. Three months into the Extended Classroom initiative (April 2015) and the loop is starting to take effect. The latest development has seen a collaboration between Academic Technology, the Learning and Development Centre, the Students' Union, the Teaching and Learning Grids, the Institute for Advanced Teaching and Learning, Careers and Skills and several academic departments (including Centre for Lifelong Learning, Life Sciences). Our collaborative project is entitled "Supporting Learning and Teaching Champions in Enhancing Appropriate Flexibility". The "champions" are students, working in the style of the E-Squad and Life Science's Digichamps team, to accelerate the loop further. The HEA funded part of the project will fund a team of students to co-design a "competency framework" for students working on such projects. This will then feed into two new, distinctly designerly, initiatives beginning in April 2015:

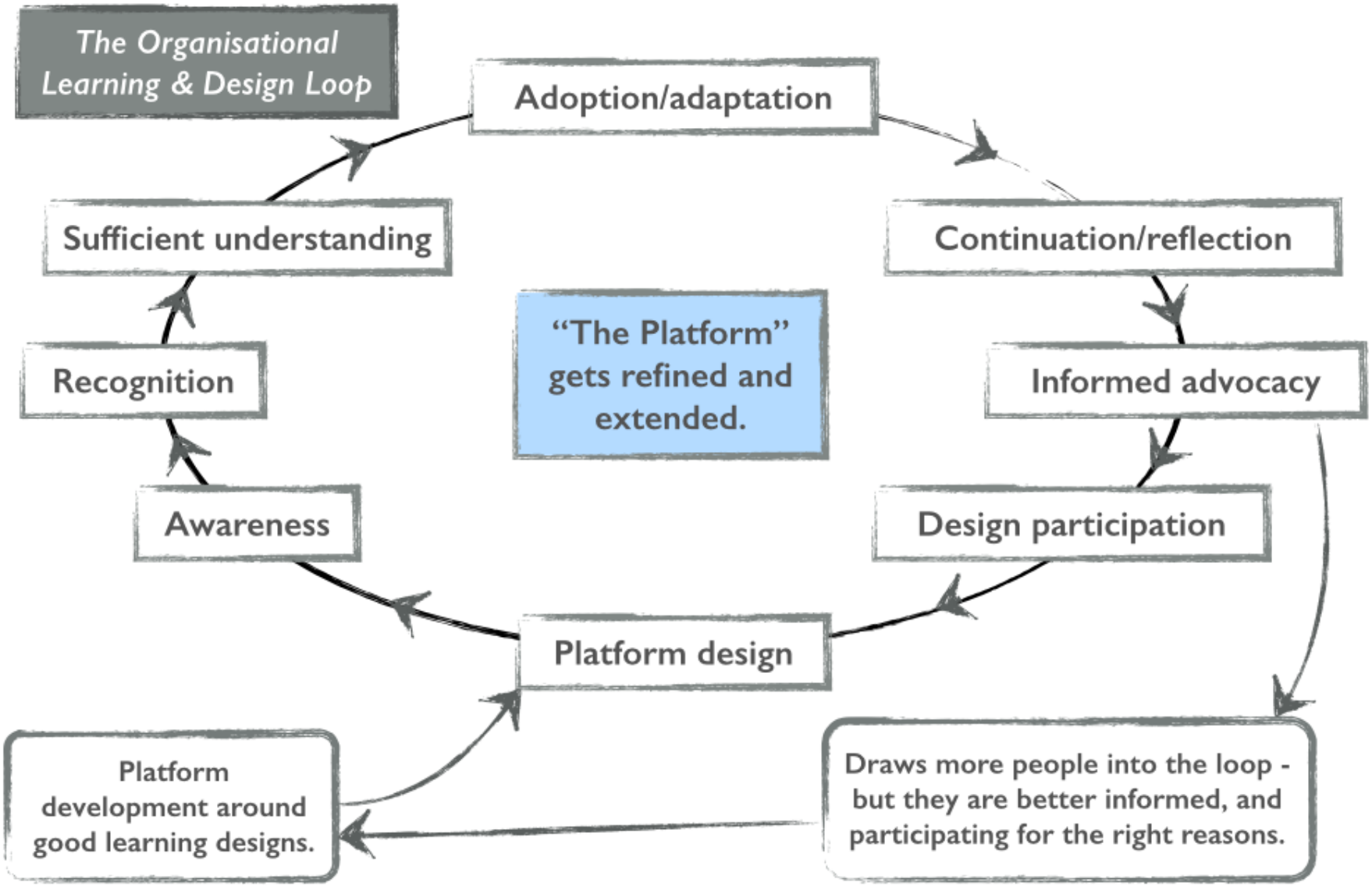
- A redesign of Warwick's course approval system, shifting its emphasis away from simple gatekeeping towards sharing good practice and providing time, space and support for enhancing learning designs. This is being facilitated by Tim Hunter of the ITS Service Design Group (an IT Services Analyst and a university trained designer).

- The Warwick International Higher Education Academy, initially designed by Christina Hughes (sociologist and Pro-Vice Chancellor for Education). This will create a more actively facilitated network of "fellows" involved in learning design, including students as designers.

Design thinking and the fit, stick, spread and grow framework will be essential to the success of these projects.

### *And finally*

Undertaking this research has been an extraordinary experience, at a vital moment in the history of the University and higher education more broadly. Its impact on my own practice and "world view" has been significant and positive. Its impact on the University, as described above, will continue for some time – it will continue to fit, stick, spread and grow. I will end by yet again thanking all of the students and staff who have helped along the way.


The Organisational Learning & Design Loop
Adoption/adaptation
Continuation/reflection
Informed advocacy
Design participation
Platform design
Awareness
Recognition
Sufficient understanding
"The Platform" gets refined and extended.
Platform development around good learning designs.
Draws more people into the loop - but they are better informed, and participating for the right reasons.

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